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Increasing Perceived Competence in Beginning Tennis players: The Effects of a Task oriented Climate and Adaptive Learning Strategies

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INCREASING PERCEIVED COMPETENCE IN BEGINNING TENNIS PLAYERS: THE EFFECTS OF A TASK-ORIENTED MOTIVATIONAL CLIMATE AND ADAPTIVE LEARNING STRATEGIES

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ABSTRACT

The purpose of the present study was to determine if the use of adaptive learning strategies increases the perception of competence of students in a leisure skills tennis class. The complex motor skills of tennis negatively influence a beginning player's demonstration of competence and motivation. Player's self-efficacy, goal orientation, and environment are linked to perceived competence, participation, effort, and enjoyment. Lowering functional task difficulty, use of modeling, and use of feedback should increase perceived competence of students. Trying to improve oneself (Task goal orientation) and being in a climate that encourages this (mastery motivational climate) are positively linked to increasing perceived competence.

To test the students' goal orientation, skill, and perceived competence, the TEOSQ, a skills test, and the subscales interest/enjoyment, perceived competence, and effort/importance of the IMI were used for the pre test of this study. The post test was conducted using the LAPOPECQ, a skills test, and the three subscales of the IMI. This study did not find significant differences in perceived competence between the treatment group and control group ($F = .113$, $p < .738$). The initial skill level of the player also did not significantly influence perceived competence ($F = 1.501$, $p < .233$). Both instructors constructed a task oriented environment which could possibly explain the rejection of the research hypotheses.

Both groups experienced bivariate correlations between task-oriented environment, effort, and enjoyment. The treatment group also had bivariate correlations between perceived competence and skill level which were not found for

the control group. An explanation for this result could be the adaptive learning strategies used during the program.

Future research could find out what parts of the program could be best used for a college leisure skills tennis class. The traditional teaching method in combination with certain parts of the program could be beneficial for future participants. It could make the leisure skills tennis class more useful for students with different skill levels and create a more positive experience for all participants.

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CHAPTER 1

INTRODUCTION

In the United States there has been a decline in participation of young people in tennis. According to Dr. Lubbers, Director of USTA Tennis Coaching Education, the USTA loses a lot of young beginning tennis players because they do not fall in love with the game (Lubbers, 2005). The reason for this, according to Dr. Lubbers, is because they do not have the fundamentals to play the game. The inability to grasp the skills is one of the primary reasons why young tennis players stop playing tennis (Lubbers, 2005). The manner in which movement and motor skills are taught are not having the outcome that the USTA wants (Lubbers, 2005). The USTA is looking for a way that will encourage young and beginning tennis players continue to play and enjoy tennis for the rest of their lives.

A new teaching method developed by the International Tennis Federation (ITF) for adults and children to learn tennis is called Serve, Rally, Score. The role of the coach is to communicate and entertain the beginning player and teach him/her first how to play the game and then teach all the technical and tactical skills (ITF, 2007). For individuals to learn the game quickly, the equipment is modified to suit their needs. This will increase their participation, enjoyment, and competence in tennis.

Overall, sport participants have three goals in mind when they enter an activity, learn the skills, be physically active, and enjoy the activity (Gill & Williams, 1996). To learn the skills, individuals have to learn the fundamentals of the sport which include motor, movement, and technical skills. The sport skills are complex

and therefore have a high functional task difficulty (Gaudagnoli & Lee, 2004). This means that the task is difficult for individuals with low skill levels.

To lower functional task difficulty, the skill level of a person will have to increase. Beginning tennis players have to learn the basic skills for them to be able to play tennis. Dr. Lubbers claims that fundamentals are the most important variable when it comes to the development of the player. To learn the skills, beginning players need to participate and have to be challenged in a way that meet their skill level and will motivate them to continue to play. This challenge level will gradually go up as the skill level of the player goes up.

A new program launched by the ITF, serve, rally, score, will help starting players improve their skills faster. This study based on the ITF program in tennis is similar to volleyball (Helion & Fry, 1995) and basketball (Chase, Ewing, Lirgg, & George, 1994) studies done on equipment and environment modifications. The program lowers nominal task difficulty so that individuals can better learn the fundamentals of the sport and feel competent in the sport at the same time. For example, there is micro tennis for young kids. The goal of micro tennis is for children to improve coordination. The balls that are used for micro tennis are sponge or soft balls and the court size is a maximum of 4X4 meters (Vural, 2005).

The program not only helps with the technical fundamentals of the players but also requires the teacher to create an environment that is suitable for learning the skills in an enjoyable way. The primary goal of the teacher is to teach the players how to play the game. His/her ability to communicate, to entertain and to organize lessons are important skills that are needed to teach individuals how to play tennis.

Teachers are important in the first stage of the development of a player because they create the environment or motivational climate for learning and they control the task of the activity (Solmon & Boone, 1993). By modifying the surroundings and equipment, the instructor creates an environment in which the student can think in ways that enables him/her to learn (Solmon & Boone, 1993). For example, in tennis practice, players can only hit to one side of the court so that there is an emphasis on learning and/or improving a certain stroke. The teacher will then give instructive feedback of how to hit the stroke correctly or give praise when the student does it the proper way which will assist in creating the task oriented environment.

To create an environment that enables students to learn and feel successful, the instructor needs to know how students interpret success and failure. According to achievement goal theory, there are two primary goal orientations, task and ego orientation. These two orientations influence an individual's motivation, subjective definition of success or failure, and ways in which to demonstrate competence (Nicholls, 1984; Elloit & Thrash, 2001).

When a person uses a task-oriented approach towards a goal, his/her present success is influenced by his/her prior performance in the same activity. When individuals compare their performance with the performance of others, they use an ego-oriented approach to demonstrate competence. The two goal orientations clarify how the demonstration of competence is directed, self-referenced or normative.

According to past research, individuals in an achievement setting want to demonstrate high levels of competence and avoid demonstrating low ability (Nicholls, 1984; Nicholls & Duda, 1992; Steinberg & Maurer, 1999). A high level of perceived competence is important for a person because it will influence his/her perceived

ability to play, participation and enjoyment in an achievement setting. Having a task orientated climate can increase the perception of competence better than an ego orientated climate because the participant's demonstration of competence through task mastery can be self-referenced. The participant has control over their demonstration of competence in a task oriented environment. In an ego oriented environment the demonstration of competence depends on factors from outside which the participant can not control, such as the opponent he/she plays. A task orientated climate has been found to directly influence task orientation (Ntoumanis & Biddle, 1999).

Task orientation of a young individual and a task oriented motivational climate are positively associated with the use of adaptive learning strategies and an increase in perceived competence (Escarti & Gutierrez, 2001; Ntoumanis & Biddle, 1999; Theeboom, De Knop, & Weiss, 1995). Studies on goal orientations, motivational climate, and physical activity on college age individuals (Kavussanu & Roberts, 1996; Ntoumanis & Biddle, 1999; Solmon & Boone, 1993) had similar findings. Individuals who perceive a task-oriented climate have more enjoyment, take on more challenging tasks, and have higher perceived competence.

Previous literature has shown that adaptive learning strategies can influence the immediate surroundings of the participant and the task of the activity. Increasing the skill level of beginning tennis players by adaptive learning strategies used by the ITF program should increase their motivation, perceived competence, participation, and enjoyment. The use of adaptive learning strategies should lower the functional task difficulty of a sport and increase the demonstration of competence.

The ITF program is based on beginning tennis players mastering their tennis skills in a modified climate that challenges them to improve their skill level. This makes the program and the motivational climate of the program task oriented according to the literature (Balaguer, Duda, & Crespo, 1999; Hebert, Landin, &Solmon, 1996; Solmon & Boone, 1993). The ITF program aims to make the learning of fundamentals easier for both adults and children.

However, while there have been studies on perceived competence and students in a leisure skills tennis class none of them use the ITF developed modification and adaptation tools to increase player development and enjoyment in tennis. Therefore, the purpose of this study was to determine if the use of adaptive learning strategies increases the perception of physical competence of students in a leisure skills tennis class.

Research Hypotheses

The study was done in a leisure skills tennis course for beginners and was therefore conducted as if the students in the course had not received any or minimal professional training in tennis. The first research question of this study was: Will adaptive learning strategies increase perceived competence faster than traditional strategies? The variables used to test this question were: change in skill and change in perceived competence. Therefore the first research hypothesis was: The influence of adaptive learning strategies will significantly increase perceived competence of a tennis player.

The second research question was: Does the initial skill level of a tennis player influence the increase of his/her perceived competence? The variables used to test this question were: pre skill test, and change in perceived competence. The second

research hypothesis was: The initial skill level of a tennis player will significantly influence the increase of perceived competence.

Who will benefit from this study?

The ITF has empirical evidence that their three stage program works on college students who enter into a leisure skills tennis class. They will be able to use the findings to provide more information in their search to motivate more people to play tennis. The ITF could also set up more college programs based on the findings of the research and come up with other ideas to introduce more people to tennis.

If the objective of the study is realized, a curriculum can be created for leisure skills tennis instructors to help increase beginners' perceived competence through adaptive strategies in a task-oriented climate. This would potentially lead to students continuing to play tennis in the future because their perceived competence is higher and they enjoy the sport more.

CHAPTER 2

LITERATURE REVIEW

An individual has to have a certain goal to succeed in before he/she can feel competent in an activity. Achievement Goal theory has the demonstration of competence as core component and it has two goal orientations, task and ego, of how someone can succeed in an achievement setting. In this chapter it will be explained why the investigator chose this theoretical background and how perceived competence is defined and used during this study. To increase perceived competence of the participants adaptive learning strategies based on previous literature and a newly developed program assisted the investigator in this study.

Achievement Goal Theory

A person's motivation to achieve in sport is a topic of interest to researchers. In 1984, Nicholls linked people's motivation in achievement settings to competency. His conclusion was that in achievement settings, people want to demonstrate competency. Nicholls developed the achievement goal theory (1984); this is a theory of cognitive motivation. It describes how individuals demonstrate competence through a certain goal perspective. (Elliot & McGregor, 2001; Nicholls, 1984; Nicholls & Duda, 1992; Stephens, 1998)

According to past research, individuals in an achievement setting want to demonstrate high levels of competence and avoid demonstrating low ability (Nicholls, 1984; Nicholls & Duda, 1992; Steinberg & Maurer, 1999). Achievement settings are settings where individuals are evaluated on their achievement of tasks. School is such a setting of achievement because the students take tests, make projects and get

evaluated, in terms of grades, on these tasks. They try to achieve the highest grade possible. Nicholls and Duda (1992) concluded that the goal-belief dimensions in academic settings also apply in athletic settings. Individuals who participate in an exercise or sport setting want to demonstrate competence (Nicholls, 1984; Nicholls & Duda, 1992). Individuals demonstrate competence in sport and school by comparing their achievement to their previous achievement or to the achievement of others.

There are two primary goal orientations, task and ego, that influence an individual's motivation, subjective definition of success or failure, and ways in which to demonstrate competence (Elliot & McGregor, 2001; Elliot & Thrash, 2001; Nicholls, 1984; Nicholls & Duda, 1992). When a person uses a task-oriented approach towards a goal, his/her success depends on how he/she achieved the goal in a previous performance. The comparison with the earlier performance indicates that the individual's judgments are self-referenced. For example, in tennis practice, when an individual hits ten services and hits five in the correct service box then the next time the amount of services in the correct box will determine if he/she is successful or not. Success lies in the hands of the individual. Improving one's performance or performing better then one had expected results in feelings of competence and perceived success (Stephens, 1998).

When individuals compare their performance with the performance of others, they use an ego-oriented approach to demonstrate competence. The outcome of the performance is more important than the process of the task. The perception of ego-oriented individuals is that the possession of ability leads to athletic success and they use the performance of others as a reference (Duda, 1996). To use the same example as before, an individual, person A, serves ten balls in tennis practice, but there is

another individual, person B, serving on the other side. Success can now be determined by whether person A hits more balls in the correct service box than person B. Previous attempts do not matter in the eyes of an ego-oriented person. When person B is more successful than previous attempts, but does not do as well as person A, he considers it as a failure.

The goal orientations are independent from each other (orthogonal); meaning that one person can have both orientations (Steinberg & Maurer, 1999). One person can be high in task orientation and low in ego orientation, vice versa or have equal levels of both. For example, someone who does karate and wants to master the fighting technique but does not want to enter into competition fighting, would be high in task orientation and low in ego orientation. Someone who wants to fight and compete but does not care about the technique is low in task orientation and high in ego orientation. Someone who wants to master the technique and enter into competition would be high in both orientations.

Goal orientations influence such factors as approaching a task, persistence, effort, and eventual assessment of satisfaction or success (Zizzi, Keeler, & Watson II, 2006). Task-oriented individuals, compared to ego-oriented individuals, select tasks that are more challenging, show more persistence in participation, have more fun and enjoyment, and believe that success is based on effort. Therefore, the development of competence is through task mastery (Duda, 1996; White & Duda, & Keller, 1998).

Ego oriented individuals believe that the demonstration of superior ability in comparison to their peers is the basis for subjective success (Elliot & McGregor, 2001; Elliot & Thrash, 2001; Nicholls, 1984; Nicholls & Duda, 1992). They evaluate competence based on normative references. Ego goals are negatively related to

enjoyment, interest, and fun in physical education (Duda, 1996; White, Duda, & Keller, 1998). When ego-oriented individuals lose in an achievement setting, they think they are not competent in it. Their goal is not met, and this affects their enjoyment, interest, and fun.

However, some studies conclude it is beneficial for sport participants to use both goal orientations instead of one. Research has demonstrated that sport participants who use both task and ego oriented goals, have higher levels of competence, intrinsic motivation, persistence and enjoyment (Hom, Duda, & Miller, 1993; Steinberg, Singer, Murphey, 2000). An individual, who adopts a multiple goal orientation, has multiple goals for success. Using both goal orientations can help sport participants with the satisfaction of a task and the demonstration of competence. If the ego oriented goal is not attained, the task oriented goal can be there as a "guarantee" (Swain & Hardwood, 1996; Steinberg & Maurer, 1999). The demonstration of competence might not be completed but having reached a goal can help a person the next time. There is some demonstration of competence that shows that the person can do it. For example, when running a marathon the goals may be to finish and to beat other runners. When the runner does not beat the other runners but does make it to the finish line, one of two goals is accomplished.

Demonstration of competence is a major part of achievement goal theory. The demonstration of competence can have a positive, desired outcome (success) or a negative, undesired outcome (failure). This is called the valence of competence (Elliot & McGregor, 2001; Elliot & Thrash, 2001). Elliot and McGregor (2001) use three different standards of competence in a framework of task and ego orientation goals. The three standards are: absolute (the requirements of the task itself), intrapersonal

(one's own past attainment or maximum potential attainment), and normative (the performance of others) (Elliot & McGregor, 2001; Elliot & Thrash, 2001). In other words, competence is measured through task mastery, improved skills, and normative reference to others' abilities.

Task goal consists of the absolute and intrapersonal standards because both standards are intrinsic. Ego goal is based on the normative standard, because it is external. Elliot divided task and ego orientation into four different categories based on the definitions and valence of competence.

Figure 2.1

Goal Orientations

	Definition	
	Absolute/intrapersonal	Normative
positive	Mastery-approach goal (task)	Performance-approach goal (ego)
negative	Mastery-avoidance goal (task)	Performance-avoidance goal (ego)

(Elliot & McGregor, 2001, p.502)

When an individual's motivation is task improvement or task mastery, one is applying a mastery-approach goal. For example, a runner tries to beat the previous time he set over a certain distance. Elliot and McGregor (2001) added a second motivation for task orientation named mastery-avoidance goal. An individual's motivation is to make sure one does not lose one's skills, ability or knowledge. For example, a tennis player will go over his/her strokes that they know, but will try to learn any new skills. A performance-approach goal is the motivation to be better than others are. For example, a runner tries to be faster than another runner. The second

ego goal orientation is the performance-avoidance goal. An individual's motivation is to try not to do worse than others do (Elliot & McGregor, 2001). When they would do worse than others, they consider themselves failures. For example, a runner tries to be just as fast as the time set by another runner.

Goal Orientation and Motivational Climate

The climate that an individual perceives him or herself to be in influences effort, persistence, cognitions, emotions, and behavior (Ntoumanis & Biddle, 1999). An individual's goal orientation will therefore also be influenced. A study by Xiang in 2002 on children, who were in the 4^{th}, 8^{th}, and 11^{th} grades, showed that different climates influence one's goal orientation. Elementary school and high school climates were examined in this study that children become more ability focused and ego-orientated in high school. The findings concluded that there is more competition against peers, more comparison with peers, and more normative feedback in high school than in elementary school (Xiang, 2002). This result illustrated that the perceived motivational climate is a major factor for both goal orientations.

Perceived motivational climate influences a person's behavior towards a goal. The perceptions of a task-oriented climate have been associated with greater perceived effort, enjoyment, perceived competence, intrinsic motivation, and greater satisfaction (Escarti & Gutierrez, 2001; Ntoumanis & Biddle, 1999; Theeboom De Knop, & Weiss, 1995). Another study by Solmon and Boone (1993) on college students concluded that task-oriented students in beginning tennis classes were more likely to take on more challenging assignments than ego-oriented students.

Having a task-oriented motivational climate influences the perception of the individual. The individual can adopt a task-oriented mindset, and use adaptive

strategies in physical education to master the task. Adaptive strategies include hard work, honesty, and personal improvement.

Individuals with high levels of ego orientation are linked to maladaptive strategies in achievement settings (White, Duda, & Keller, 1998). This means that an ego-oriented person is more likely to cheat to succeed, because one's focus is on beating others. When an ego-oriented climate is enforced, a student is more likely to think of sports as a way to boost social status, such as being accepted by teammates, use deceptive tactics, and learn how to bend the rules (White, Duda, & Keller, 1998).

According to Ntoumanis and Biddle (1999) "a mastery (task oriented) climate affords choice, self-determined criteria for success and, hence, autonomy" (p. 660). Autonomy in a task-oriented climate positively influences an individual's perception of competence (Ntoumanis & Biddle, 1999). Another study on autonomy and goal orientation concluded that both task oriented and ego oriented students perceived more enjoyment in an autonomous communication style setting than in a controlling communication style setting.

An autonomous communication style is a more self-determined motivation style for students and a controlled communication style is a style that controls the motivation of the students more (Spray, Wang, Biddle, & Chatzisarantis, 2006). For example, an autonomous communication style gives the students multiple options to hit a tennis ball to the other side of the court, such as bending the knees, keeping the stroke longer or using more of their shoulders. A controlled communication style only gives the students one way to hit the ball to the other side of the court, such as just using more of their shoulders.

There was a difference between task- and ego-oriented individuals when an autonomous communication style was implemented. Task-oriented people performed better because they would practice on their own when it was not required. Task-oriented students in a sport setting show more independent learning than ego-oriented students (Spray, Wang, Biddle, & Chatzisarantis, 2006). This suggests that an autonomous setting has a higher positive impact and creates a greater effect of adaptive behavior in sport.

There are studies that emphasize the creation of a task-oriented climate in physical education classes to stimulate participation of children and adolescents (Escarti & Gutierrez, 2001; Ntoumanis & Biddle, 1999; Papaioannou, Bebetsos, Theodorakis, Christodoulidis, & Kouli, 2004; Theeboom, De Knop, & Weiss, 1995). This is because a task-oriented climate and its influence on task orientation have been positively linked with perceived competence. A task-oriented climate has a positive connection with a student's motivation because success is defined through personal improvement. Performing ones best or beyond personal expectations, provide perceptions of competence for those who are task-involved (Boyd & Yin, 1996). Task-oriented students with different levels of ability are more motivated to improve and learn new skills through effort than ego-oriented students (Solmon & Boone, 1993).

In an ego-oriented climate, students with low perceived competence and ability are less motivated to achieve their goal (Escarti & Gutierrez, 2001). When an ego-oriented situation is perceived, participants feel more pressure, and have less enjoyment, because their competence is dependent on how much they win or lose. A

consequence is that students are not satisfied and are more likely to quit or practice with less intention in the near future (Escarti & Gutierrez, 2001).

According to a study by Pensgaard and Roberts (2000), elite athletes reported that the coach becomes a distress when he creates an ego-oriented climate. Coaches many times think that an ego-oriented climate is needed right before competition to get the right mindset. The study was conducted with elite athletes who competed in the Olympic Games. The authors suggested that the coach should try to create a more task-oriented climate so that athletes have less distress going into competition. Elite athletes are familiar with high-pressure situations and stress, and they would rather have a task-oriented climate during practice time or right before competition than an ego-oriented climate (Pensgaard & Roberts, 2000). Elite athletes complaining about what kind of motivational climate their coach uses are an indication of how it may affect both recreational and amateur athletes as well.

As past research indicates, a task-oriented climate should positively influence the effort, persistence, cognitions, emotions and behavior of the students in an amateur sport setting (Ntoumanis & Biddle, 1999; Theeboom De Knop, & Weiss, 1995; Escarti & Gutierrez, 2001). Gill and Williams (1996) concluded that sports participants predominantly seek to learn skills, be physically active, and to enjoy the activity. Perceived competence, task orientation, and intrinsic motivation in physical education are determinants of participation in sport (Papaioannou et al., 2006). A task-oriented climate is related to greater perceived participation, higher levels of enjoyment, and satisfaction (Theeboom et al., 1995).

The teacher of a physical education class creates the climate that he/she wants to teach in. Therefore, the authority figure has a great influence on student's

perceptions of competence (Goudas & Biddle, 1994). The motivational climate created by the teacher can motivate or demotivate a student's participation in the class. The relationship between motivational climates, the authority figure, and perceived competence are crucial for the development of the athlete (Lubbers, 2005). When an autonomous task-oriented climate is pursued by the person in charge, it is likely that the students adapt to the same mindset and are more motivated to participate in class. Not only will the student's motivation be higher in the class, but also the motivation to practice on their own will be higher (Spray, Wang, Biddle, & Chatzisarantis, 2006).

Teachers who try to construct a realistic climate for beginning players who need to develop their sport skills, should initially construct a task oriented motivational climate (Escarti & Gutierrez, 2001; Ntoumanis & Biddle, 1999; Papaioannou et al., 2004; Theeboom et al., 1995). The beginning players need to learn the basic skills to be able to play the sport. When the players have learned the basic skills, competitive situations can be included, and the climate can become more ego-oriented. These competitive situations should increase with the level of competence of the participants (Steinberg & Maurer, 1999). This will keep the participant's interest, and the lessons will be considered more useful to them.

Steinberg and Maurer (1999) stress the benefits of having a multiple goal strategy in a motivational climate instead of just one. Their research concluded that sport participants using both goal orientations have higher levels of competence, intrinsic motivation, persistence and enjoyment. They suggest that instructors should teach students to emphasize both goal orientations and help them in the decision of when to use which orientation. To help the students make this decision the teacher

should create a climate that motivates them to act and think in ways that enable them to learn (Solmon & Boone, 1993, p. 419). To do so, the teacher has two tasks that need to be accomplished. First, he/she needs to set up a realistic learning climate that has both task and ego oriented situations (Steinberg & Maurer, 1999). Second, he/she needs to help students choose the appropriate goals for each situation (Steinberg & Maurer, 1999).

Perceived Physical Competence

Achievement goal theory underlines the role of perceived physical competence in guiding achievement behavior (Ntoumanis, 2001). Perceived physical competence is an individual's belief of competence to accomplish a task (Papaioannou, Bebetsos, Theodorakis, Christodoulidis, & Kouli, 2004). Perceived competence and self-efficacy are used inter-changeably but the concepts are different according to Bell (1997). When using the term perceived physical competence, it means one's overall perceptions of personal physical abilities (Bell, 1997). "Self-efficacy describes the belief one has in being able to execute a specific task to obtain a certain outcome (Bandura, 1977)." Perceived competence is the feeling or perception of mastery an individual has in the overall task or ability and self-efficacy is a specific part of the overall task or ability (Bell, 1997). Therefore self-efficacy is a factor in perceived competence. For example, tennis is the overall task in which perceived physical competence can be measured and the multiple strokes such as forehand, backhand, volley, service, are the specific tasks. These specific tasks can be influenced by self-efficacy.

Another study by Sonstroem, Harlow, Gemma, and Osborne (1991) on perceived competence and self-efficacy concluded that self-efficacy is positively

linked to perceived competence in their Exercise and Self-Esteem Model. In this model, self-efficacy is a component of perceived competence and therefore by increasing self-efficacy, perceived competence should increase too. Self-efficacy judgments are influenced by task performance, vicarious experiences, verbal persuasion, and emotional arousal.

Task performance refers to the individuals' acknowledgment of the degree to which they succeeded on tasks (Margolis & McCabe, 2006). An individual's goal orientation and the difficulty of the task influence his/her perception of degree of success. Task-oriented individuals tend to take on more difficult challenges than ego-oriented individuals (Solmon & Boone, 1993). Task difficulty can be divided into two groups: nominal difficulty and functional difficulty. "Nominal difficulty is the constant amount of task difficulty, regardless of who is performing the task and under what conditions it is performed" (Gaudagnoli & Lee, 2004, p. 213). For example, the size of a tennis court, every player has to play inside the court to be able to play the game.

"Functional difficulty refers to how challenging the task is relative to the skill level of the individual performing the task and to the conditions under which it is being performed" (Gaudagnoli & Lee, 2004, p. 213). For example, tennis champion Roger Federer will play better than a beginning tennis player because his functional difficulty is lower. The combination of high functional task difficulty and complex motor skills in tennis will have a great influence on the perceived competence of beginning tennis players.

When looking at perceived competence, individuals with high-perceived competence are more likely to participate in sport and are more satisfied with their

involvement (Boyd & Yin, 1996). Several studies have shown that when there is a task-oriented climate, individuals with low and high perceived competence have more satisfaction than in an ego oriented climate (Ntoumanis & Biddle, 1999; Papaioannou et al., 2004). Perceived physical competence, perceived usefulness of the lesson, and interest in the lesson are positive indicators of students' participation in the lesson (Papaioannou et al., 2004).

Goal-setting becomes an important factor of the student's perceived physical competence. Enhanced learning is the primary focus in practice situations, while performing optimally or outperforming one's opponent is the focus in competitive settings (Munroe-Chandler, Hall, & Weinberg, 2004). Collegiate athletes tend to set task-oriented goals in practice and use ego-oriented goals in competition (Munroe-Chandler, Hall, & Weinberg, 2004). Collegiate athletes also tend to focus on skill development more than they do on tactical and strategic development (Weinberg, Burton, Yukelson, & Weigand, 1993). If the focus of collegiate athletes is on skill development, then regular students who take a leisure skills course should also focus on this. The students tend to enter a leisure skills tennis class that is taught in a way for them to learn new skills and not only to beat others.

The goals that students set in an achievement setting should match their ability and should be realistic (Halliday, 1999). Students who sign up for a beginners leisure skills course should focus on learning the skills of the sport and not on winning or losing, because they do not have the necessary skills and knowledge to beat others. When the ability of the students increases, so will the challenges of the task. Task difficulty should increase parallel to the increase of the student's self-efficacy and perceived competence (Gaudagnoli & Lee, 2004).

The second source of self-efficacy is vicarious experiences. These are experiences an individual picks up from watching others doing a certain skill and then trying to copy that skill. “The process by which individuals attempt to perform a skill demonstrated by another is called modeling” (Berlant & Weiss, 1997, p. 317). Vicarious experiences and modeling can therefore be seen as the same concept. In the leisure skills tennis class, there will be students who already have experience in tennis and they can help other students acquire new skills and strategies to accomplish tasks. The person who demonstrates the skill or movement can have a great influence on someone’s perceived self-efficacy. Students use the modeling as a visual and cognitive guide to perform the skill or movement. There are two kinds of modeling, mastery and learning models.

“Mastery models flawlessly demonstrate a targeted skill or learning strategy (Margolis & McCabe, 2006, p. 222).” However, a learning model is an unskilled model that is observed practicing a skill (Hebert & Landin, 1994). A learning model would be a better way to demonstrate a skill to beginning tennis players because they can observe how the model overcomes mistakes and will receive valuable task feedback from the instructor (Margolis & McCabe, 2006). The information received from the instructor can give the students the perception that they can achieve the same goal as the model.

The received information will affect the student’s perceived usefulness of the lesson. Verbal persuasion and the information that a teacher gives must be seen as useful otherwise the students will not accept the information. The credibility of the information source is just as important as the information itself.

When the credibility of the information source is perceived to be low, the individual's belief of succeeding in a task is lower and his/her effort to try will be less (Margolis & McCabe, 2006). A way to give an information source more credibility is to make sure students succeed in tasks. "By regularly stating that learners will succeed on specific tasks, tasks on which they do succeed, and follow up with task specific feedback outlining what learners did that produced success, teachers can capitalize on this important source of self-efficacy (Margolis & McCabe, 2006, p. 220)." In other words, by giving task feedback to students about what they did right or wrong, their self-efficacy should improve over time.

Previous research has shown that students who receive constructive feedback in a task improve significantly faster than students who do not receive feedback for a task (Fredenbrug, Lee, & Solmon, 2001). The information about how to perform a task is important and necessary in the initial stages of learning a complex motor skill (Fredenbrug, Lee, & Solmon, 2001). An instructor has to provide task feedback because he/she has the knowledge. Another form of feedback is the ability to motivate students. The instructor can help motivate students with thoughts about their abilities, ideas about how to achieve goals, and attitudes about a class (Fredenbrug, Lee, & Solmon, 2001).

Multiple sources of task feedback are recommended for instructional climates including, corrective feedback, prompting, process feedback, instructive feedback, and praising (Margolis & McCabe, 2006). Corrective feedback shows students how to correct mistakes. Prompting is the use of prompts for students, who need visual or physical information to help correct their mistakes. For example, a tennis teacher might help a student hit the ball deeper in the court by saying to relax more, as with a

golf swing. To hit a ball far in golf the person has to be relaxed and not tense. In tennis, it is the same way; the ball goes deeper in the court, when the body of a person is more relaxed. Praise is used when there is an improvement of a student's performance based on the previous performance of the student (Margolis & McCabe, 2006).

With the multiple sources of task feedback, there are also the two types of focus of feedback, external and internal. External focus feedback is directed to the movements of the individual and the affect it has on the climate. Internal focus feedback refers to the coordination of the individual's body movements (Wulf, McConnel, Gartner, & Schwarz, 2002). For example, internal focus feedback for a tennis player is making him/her focus on hitting the ball in front of him/her so that the ball can be controlled better. External focus feedback is when a tennis player focuses on where to hit the ball on the court and does not focus on the technical aspects of the strokes.

Multiple studies by Wulf have shown that externally focused feedback resulted in a more effective performance in a complex motor skill (Wulf, McConnel, Gartner, & Schwarz, 2002; Wulf, Prinz, & Hob, 1998). One of the studies was on novice and advanced volleyball players and both groups were improving faster with external feedback. In a leisure skills course there are usually students with different skill levels. This study concluded that external feedback is useful for different kinds of skill levels. Internal feedback actually had a detrimental effect on the improvement of the students' complex motor skills. Students focus too much on their movements and with the information given by the teacher, it could lead to a disruption of learning motor skills.

External feedback addresses the student's physical movements. The reason for this is that to learn a complex motor skill, some body movements have to be addressed to make the skill possible (Wulf, McConnel, Gartner, & Schwarz, 2002; Wulf, Prinz, & Hob, 1998). According to Wulf, it is necessary to give frequent feedback. This enhances complex motor skill learning faster until a certain level of expertise is achieved (Wulf, Shea, & Matschiner, 1998).

Emotional arousal or physiological reaction is the fourth source of self-efficacy. The state of the student before, during or after the activity influences self-efficacy. When a student is highly anxious, excited, bored, stressed, or queasy, it influences one's perception of the activity (Margolis & McCabe, 2006). This source of self-efficacy is less controllable factor for a teacher. The other sources of self-efficacy are more controllable factors for the teacher because the teacher can manipulate the learning climate to a certain degree.

Adaptive strategies

As mentioned before, sport has a high functional task difficulty because of complex movement and motor skills. Newell´s (1984) model of constraints can help lower functional task difficulty by assessing what modifications or adaptations are needed to make an activity challenging and enjoyable for participants. Structural constraints can be body structure, and abilities. For example, individuals with a disability have a body structure constraint and therefore can not play every sport as it is meant to be played. A good example of that is wheelchair tennis; the players are allowed to bounce the ball twice instead of once like in regular tennis. Functional constraints are the behavior and motivation of individuals. When an individual does not have the motivation to learn a skill then it is a constraint.

The degree of functional task difficulty of tennis is influenced by the structural and functional constraints of the player. High functional task difficulty can lower students' motivation because their structural constraints are too high. To lower the challenge of the task to the skill level of the player, instructors need to decrease the constraints of these students through modification or adaptations of the game. There are three factors where modifications or adaptations can be made: the individual, the climate, or the task/activity (Menear & Davis, 2007). An instructor does not have control over the population therefore the other two factors are the ones that need to change to lower the constraints and create a challenge for the students. "…instructors can provide all individuals with an appropriate balance of challenging activities and successful progression through a comprehensive curriculum or activity sequence (Menear & Davis, 2007, p. 38)."

The first factor a teacher can influence is the climate. The climate is the immediate surrounding of the activity, meaning the size of the group, surface, the size of the playing field, and if it is played indoors or outdoors. For example, volleyball can be played indoors as well as outdoors, but both climates have a different influence on the player. Modification of the climate will help beginning students grasp the motor skills needed to play the game (Lubbers, 2005). Helion and Fry (1995) stated that when physical educators reduce the field of play students' endurance levels and active participation increase. For example, the size of a soccer field is an important factor when it comes to the participation of the students. A smaller field should help students get more ball contact than when soccer is played on a regular sized field.

The Turkish Tennis Federation came up with certain teaching concepts for young beginning players that include the use of different court sizes. These concepts

are micro-mini-midi-maxi tennis. The first two concepts, micro and mini are developed for young children who do not have the power yet to play on a full sized court (Vural, 2005). However, the goals that the Turkish Federation wants to accomplish can be transferred to regular beginning tennis players. The goal for micro tennis is to have children learn coordination. The balls that are used for micro tennis are sponge or soft balls and the court size is a maximum of 4X4 meters. For mini tennis, children mainly learn basic strokes, grips, balance, and body turn. The same balls are used as in micro tennis, but now they are used on a court size of 6X12 meters. Children play simple games and learn simple tactics to develop these movement and motor skills (Vural, 2005).

Equipment is another environmental influence that can be modified. Equipment should match a player's abilities, and this will lead to more success and enjoyment (Helion & Fry, 1995). A good example used by Helion and Fry is the use of different balls during volleyball practice. "A progression from beach balls to Nerf balls to trainer balls reduces the fear associated with using regulation equipment in the initial stages of volleyball skill acquisition (Helion & Fry, 1995, p. 58)."

Over the last few years there has been a similar movement in tennis. In Europe tennis academies use different kinds of equipment to help young children become familiar with the game on a level that matches their abilities. On the website www.tennisplayandstay.com multiple video images show the different kinds of balls, rackets, court sizes, and exercises tennis teachers can use to teach tennis with modified equipment.

Dr. Paul Lubbers, who is the Director of USTA Tennis Coaching Education, says that when children/students become exposed to tennis, the primary objective

should be that they fall in love with the game. Three variables need to be encouraged to help children and students grow: fun, fundamentals, and involvement.

Fundamentals is the main variable when it comes to the development of the player (Lubbers, 2005). This approach, using different kinds of rackets, balls, and courts, is one of the reasons why young European players are developing complete games. Children play competitive mini court games with appropriate rackets and balls. Lubbers says, "When you give them the right equipment, they look the way you would like players to look like when they are adults (Lubbers, 2006, p. 1)." An example that Lubbers uses is a video made in Belgium that shows six young kids with regular balls and rackets. The children are on a regular court and are off balance, and have no control over their movement and strokes. Another video shows six kids with the modifications, smaller court size, different balls, and different rackets, and the children demonstrate much more enjoyment, balance, and sound strokes. The best part is that the children in the videos are the same six children (Lubbers, 2006).

By making the game more fun through modifications and adaptations, more young people should continue to play sports. Tennis in the United States loses a lot of young people just because they can not play the sport. Someone will have a difficult time enjoying a sport he/she can not play and in which he/she does not succeed (Lubbers, 2005-2006). The International Tennis Federation has come out with a manual stating that coaches should introduce tennis to children and adults using slower red, orange, and green balls on a reduced court (ITF, 2007). Just like in other sports, tennis needs modifications in the development stages to help players enjoy it more.

Research in basketball has shown that modified equipment has a positive affect on children. For example, children practicing with lower baskets improve quicker than using standard height baskets (Chase, Ewing, Lirgg, & George, 1994). The study was done with smaller balls and lower baskets, but there was no significant difference when using the smaller balls. However, the modification of lowering the basket increased the children's perceived self-efficacy and enjoyment (Chase, Ewing, Lirgg, & George, 1994). Bandura (1977) stated that when one's probability of success in a task increases, their self-efficacy can increase too.

The second factor that a teacher can influence is the task of the sport itself. The teacher can decide what he/she teaches and what is expected of the students. These tasks are influenced by the activities, goals, and equipment. These three variables can be designed to make the task complex or simple (Menear & Davis, 2007). Changing the rules of the activity is another form of modification of the game. For example, in tennis it is normal to use the whole court when playing doubles, the task would change when the players are only allowed to hit in the singles court and no longer in the doubles alleys. This is just one example of how the task of a game can be modified, there are other ways to make a difference by changing the speed or force, the time allowed (Menear & Davis, 2007), the size of the team, the motor patterns, and by using modified scoring (Helion & Fry, 1995).

In the end, modification of activities must be used to make sure students have a positive interaction with the activity and that their participation is successful (Helion & Fry, 1995). The result of the study by Menear and Davis (2007) on modified activities to help individuals with disabilities in regular sporting events can also be used for able bodied beginning players. "Ultimately, physical activity modification

should lead to meaningful experiences that teach or reinforce functional skills, which lead in turn to more challenging activities and skills that can be applied to other activities or settings (Menear & Davis, p. 40)."

Some questions that physical education teachers need to ask themselves when wanting to make modifications are:

- "Will the participant be able to engage in the activity sufficiently?"
- "Will the activity motivate participants to continue engaging in physical activities?"
- "If it is an inclusive activity, will all participants feel successful as a result of their involvement?"
- "If it is an inclusive activity, will all participants feel challenged during the activities?"

(Menear & Davis, 2007, p. 38)

In summary, a task-oriented motivational climate has been found to directly influence task orientation. Task orientation of an individual and a task oriented motivational climate are positively associated with the use of adaptive learning strategies and an increase in perceived physical competence.

Perceived self-efficacy is part of perceived physical competence and it increases when the chance of success is higher. Modifications and adaptations are there to help beginning students to get the fundamentals they need to have a better experience and a higher likelihood to continue to play the sport in the future. The challenges of the sport need to be adjusted to the abilities of the player and progressively be increased to the traditional form of the sport.

It is very important for physical education teachers to know how they can make activities meaningful, challenging, and fun for students with different skill levels. Research has demonstrated that young beginning players of a sport can best be taught the game through modification and adaptations. Equipment and climate modifications and the manipulation of self-efficacy sources should increase perceived competence, students should perceive the leisure skills course useful and interesting.

To give better support to increasing students' perceived competence, the sources of self-efficacy are manipulated in a way that will help the students in the development of their tennis skill. It should result in a faster improvement of motor skills. The combination of feedback and low task difficulty increasing to higher task difficulty during the semester should increase the student's self-efficacy and perceived competence more rapidly. If the objectives of the present study are realized a curriculum can be created to help increase beginners' perceived competence through adaptive strategies in a task-oriented climate.

Therefore the purpose of this study was to determine if the use of adaptive learning strategies would increase the self-perception of competence of students in a college leisure skills tennis class. The study was conducted with the assumption that the students in the course had not received any or minimal professional training in tennis. Therefore the first research hypothesis is: The influence of adaptive learning strategies will increase perceived competence of a tennis player. The second research hypothesis is: The initial skill level of a tennis player will influence the increase of perceived competence.

CHAPTER 3

METHODS

Participants

The study had 71 participants, who were college students registered in three beginning tennis classes and one intermediate tennis class. The students were told the nature of the study and asked to sign informed consent forms on their agreement to participate in the study. The students in the beginning classes should not have had previous experience in tennis. The students in the intermediate classes should have had the equivalent of high school tennis experience. All participants were between the ages of 18-32 with an average age of 21.82 years old.

Two instructors who agreed to participate in the study taught the classes. Both instructors taught tennis in the semester prior to the study and were trained in use of the racket, contact point of the ball with the racket, and footwork for the ground strokes. One instructor was a graduate teaching assistant and the other one was a staff member for the Parks, Recreation and Tourism Management Department. Both instructors were working for a supervisor of leisure skills courses.

The Mission statement of the Clemson University Leisure skills program is:

"The Clemson University Leisure Skills program believes that individuals can advance their lives both personally and professionally through involvement in recreation. With that in mind our mission is to serve the educational, recreational and personal development needs of Clemson students through the teaching of leisure and life skill activities. The Leisure Skills program is committed to offering a variety of classes to meet the diverse interests of the Clemson University students." (Anderson,

2006) The leisure skills instructors taught their classes with the mission statement in mind. The instructors educated students on the rules, techniques, strategies and tactics of the game and tried to build better tennis players.

Methods

The treatment group instructor used a curriculum that contained the adaptive learning strategies, including different kinds of balls and court sizes. The study was a quasi experimental design because of the use of a control group and a treatment group. One beginner class and one intermediate class comprised the treatment group and the other two beginning classes the control group. The focus of the study was on the skill level of the students. The different kinds of classes were not a limitation to the study because students with different skill levels enrolled into both classes. For example, a student with some experience enrolled into the beginners' tennis leisure skills course and students with no experience enrolled into the intermediate tennis leisure skills course.

The investigator and the assistant coach of the men's varsity tennis team did two checkpoints for both groups. This was to observe the method of teaching in the treatment group and the control group. The observations of the groups were done in the same weeks. A checksheet (see Appendix A) was made so that the observer knew what to look for during class.

Procedure

The first week of the semester, the students were taught forehand and backhand basics such as grips, preparation, stands, and swing. In the first week the students were informed of the study and were given the syllabus. In the second week, the participants had a skills test to measure their level of ability and were asked to fill

in a questionnaire about perceived competence and goal orientation. The skills test and questionnaire were used as pretests. This was done to determine the initial skill level and level of perceived competence of the students in both the control and treatment group, and the progression they made throughout the course. The results of the tests assisted the experimental group instructor in assigning students with similar skill levels to practice with each other during stage 3 and 4 exercises.

The study lasted seven weeks in the spring semester. The daily practice for both groups consisted of three parts. The treatment group used adaptive strategies to encourage perceived physical competence. The first part was a warm-up of 15 minutes with an orange dotted ball on a mini court. The orange dotted ball came from the new International Tennis Federation practice manual. Three different kinds of balls were used in this manual, red, orange and green ones. The reason for starting with the orange dotted ball was because adults would break the red sponge ball too easily. The red ball is mainly developed for children under the age of 10. “The strength of the player and the size of the racket would break the red ball,” according to Dr. Lubbers. (phone conversation, 9/12/2007)

The second part of the teaching technique was the teacher explaining and using modeling techniques to the students. The teacher modeled techniques the first 2 weeks and then used students as models to help the students see how other students overcame mistakes and used various techniques. The model did the correct movement 5 times without a ball. After the demonstration, the students rallied with each other one on one and focused on the technical movements of strokes and footwork. The orange dotted ball is 50% slower and has a lower compression which allowed the participants more time to set up their stroke and footwork and get more repetitions

than with a regular tennis ball. This was done on a 60ft court to make sure the participants could hit more balls. During this time, the instructor gave corrective feedback to the students on their technique and footwork.

This part of the teaching technique also included practicing the direction of the ball and aiming for targets in the latter part of the study. This part took 30 minutes of each class period. The orange dotted ball was used the second and third weeks on a 60ft court, the ball with the green dot (25% slower) was used in the fourth week and the first part of the fifth week on a full sized court, and the last part of week five and week six were done with a regular tennis ball on a full sized court, and week seven was used to test the participant's perceived competence and actual tennis shot ability. The objective was to have a smooth transition from the orange dotted ball to the tennis ball.

The third part was playing points with the orange dot ball, green dot ball, and regular tennis ball in the weeks they were used. The third part took 20 minutes and was played through various games such as tennis with volleyball rules, ping-pong doubles rules, and half-court boundaries.

Tennis with volleyball rules is a doubles game where the doubles team can hit the ball towards each other once before hitting the ball back over the net. Ping-pong doubles rules is a doubles game where each player can only hit the ball after one's partner has hit the ball. Person A hits the ball over the net, then person B has to hit the next ball, person A has to hit the following ball and it goes on like that until someone misses. This will increase participation in the tennis class. Half-court boundaries are games played on half a court that will help students hit more balls and volleys. The intention of these task-oriented games was that students would have more enjoyment.

The outcome of the games should not be as important to the students because the games are not played using traditional tennis rules.

The control group had the same kind of stages but did not have the adaptive strategies included. All exercises were done with a regular tennis ball and all the exercises were done according to the traditional teaching methods. The games played were also be according to traditional tennis rules.

During week seven a skills posttest was conducted and a perceived competence questionnaire was given after the skills posttest. A more detailed description of the curriculum explained above can be found in appendix B.

Measurements

Task and Ego Orientations in Sport Questionnaire: The TEOSQ was used to assess individual goal orientations in this study (TEOSQ; Duda & Nicholls, 1992). This instrument consists of 13 items comprising two orthogonal scales. This means that the scales are independent of each other. Students, for example, answer to statements like "I feel most successful when I work really hard" for items reflecting task-oriented criteria and statements like "I feel most successful when I am the best" for items reflecting ego-oriented criteria. Responses are made on a Lickert scale ranging from strongly disagree (1) to strongly agree (5). The TEOSQ has been found to be a reliable and valid instrument for measuring goal orientations (Duda, 1992). Duda concluded that Cronbach's (1951) alpha coefficients have ranged between .81 and .86 for task-oriented subscale and between .79 and .90 for the ego-oriented subscale (Berlant & Weiss, 1997). The TEOSQ has been used in previous tennis skill studies and has demonstrated factorial and construct validity and reliability in the physical domain (Duda & Nicholls, 1992; Escarti & Gutierrez, 2001).

Intrinsic Motivation Inventory: The IMI was used to assess intrinsic motivation in sports based on three subscales: interest-enjoyment, perceived competence, and effort-importance (IMI; McAuley, Duncan & Tammen, 1989). It was comprised of 18 items that were slightly modified for this study. The IMI was used for tennis skills specifically. In 1999 Hatzigeorgiadis and Biddle used the IMI to assess the same subscales for tennis players and modified the IMI to the sport. Students, for example, answer to statements like "I was pretty skilled in this activity" for items reflecting the perceived competence subscale. McAuley et al. provided evidence for the validity and reliability of the IMI when applied to sport and exercise settings. Alpha coefficients for each of the subscales were: interest-enjoyment (alpha = .78), perceived competence (alpha = .80), effort-importance (alpha = .84).

Learning and Performance Orientations in Physical Education Classes Questionnaire: The LAPOPECQ was used to assess what kind of classroom goal structure students perceived during the program. It comprised of 27 items that were divided into five subscales: teacher-initiated learning orientation, students' competitive orientation, students' worries about mistakes, outcome orientation without effect, and students' learning orientation. The LAPOPECQ was modified to fit the study. The phrase "PE" was substituted by "Leisure skills". Students, for example, answer to statements like "The LS instructor is most satisfied when every students learns something new" for items reflecting task oriented environment criteria and statements like "It is very significant to win without trying hard" for items reflecting ego oriented environment criteria. The LAPOPECQ was tested by

Papaioannou in 1994 and provided evidence for validity and reliability of the LAPOPECQ, alpha coefficient was .60.

Skill Evaluation: At the beginning of the semester, all students completed a tennis skills pretest. A similar skills test has been used by Solmon and Boone (1993) in their study of college students in a leisure skills tennis class. This modified version of Solmon and Boone's test consisted of the instructor feeding balls to a participant who stands behind the baseline, trying to hit the ball into squares placed on the opposite side of the net. The squares had certain point values with the squares closest to the sidelines having the greatest point values.

After a demonstration and explanation of the scoring system, the students hit 5 practice shots of each stroke. The test would then begin with 10 forehands, 10 backhands, 10 forehand volleys, 10 backhand volleys, and 10 serves into a singles court. For the ground strokes and volleys, the court was divided in 9 squares, see Appendix B. The serve test was done on a different court; the two parts of the service boxes were marked in a similar manner. The subjects served five times to each court (see Appendix B).

The hitter hit 10 balls per stroke, and hit a total of 50 balls. One of the participants counted the total number of points the hitter got during the 50 balls. After the 50 balls, the student who counted went to the other side and became the hitter. The hitter moved and filled in a questionnaire about perceived competence, perceived tennis shot ability and goal orientation. After filling in the questionnaire, the student helped pick up balls.

This test was similar to the one used by Solmon and Boone (1993) on college students in beginning tennis classes. They established reliability with the Spearman-Brown prophecy formula (Thomas & Nelson, 1990). The split-half reliability estimate for their skill assessment was .77. The skill test was repeated during the final week of the research.

Data Analysis

A one way ANOVA was used to assess the relationship between adaptive learning strategies, goal structure perspective, and perceived physical competence. The first set of variables was the scores from the task and ego scales of the LAPOPECQ. The second set of variables was the perceived competence scores of the IMI and skill evaluation test.

A second one way ANOVA was used to assess the relationship between initial skill level and the change in percieved competence within the treatment group. The first set of variables was the pre test skill scores from the skill evaluation test and the second set of variables was the change in perceived competence scores. This was done to determine whether the adaptive learning strategies would influence the increase of perceived competence of students with a certain skill level.

CHAPTER 4

DATA ANALYSIS

This study was focused on examining the impact of perceived competence in beginning tennis players in a leisure skills tennis class. The first research question of this study was: Will adaptive learning strategies increase perceived competence faster than traditional strategies? The variables used to test this question were: change in skill and change in perceived competence. The second research question was: Does the initial skill level of a tennis player influence the increase of his/her perceived competence? The variables used to test this question were: pre class skill, and change in perceived competence.

The variables of task and ego orientation were used to assess the goal orientation of the students. Task environment and ego environment were also used to test the perceived structure of the class during the program. The variables, change in interest-enjoyment and effort-importance, were used to indicate if the perception of the class changed during the program. This was done to see if the groups had a different view of the class.

Some cases were excluded from the research because the participants had not completed either the pre test or the post test. Their scores were not useful to the investigator because it was not possible to receive change of perceived competence scores and change in skill scores. In addition, there were six participants who had not filled in the questionnaire completely. The missing variables were substituted by the mean score of the total scale. This was done so that the mean scores would not be affected by those individuals or missing values (Mertler & Vannatta, 2001).

Demographics

This study was conducted using four leisure skills tennis classes at Clemson University. Three of the classes were beginning tennis classes and one was an intermediate tennis class; all classes were conducted at the tennis courts of Clemson University. The treatment group consisted of two classes and the control group consisted of two classes. The treatment group had 37 (52.1%) students, 20 (28.2%) participants from class one and 17 (23.9%) participants from class two. The control group had 34 (47.9%) students, 17 (23.9%) participants from class three and 17 (23.9%) participants from class four, see Table 4.1.

Table 4.1

Treatment

		Frequency	Percent
Valid	Treatment	37	52.1
	No	34	47.9
Treatment		71	100.0
	Total		

The entire population of this study was 71 students with 52 (73.2) males and 19 (26.8) females, see Table 4.2. There were a total of 5 (7.0%) freshmen, 6 (8.5%) sophomores, 10 (14.1%) juniors, 35 (49.3%) seniors, and 15 (21.1%) graduate students, see Table 4.3. The average age of the participants in this study was 21.82 years.

Table 4.2

Gender

		Frequency	Percent
Valid	Male	52	73.2
	Female	19	26.8
	Total	71	100.0

Table 4.3

Year

		Frequency	Percent
Valid	Freshman	5	7.0
	Sophomore	6	8.5
	Junior	10	14.1
	Senior	35	49.3
	Graduate	15	21.1
	Total	71	100.0

Pre-Testing

Intrinsic Motivation Inventory. Internal consistency was found to be strong for all three factors in the pre test, interest-enjoyment (α = .898), perceived competence (α = .875), and effort-importance (α = .770). These values are consistent with previous research (McAuley, Duncan & Tammen, 1989).

Task and Ego Orientation in Sports Questionnaire. Both goal orientation values were consistent, task (α = .867) and ego orientation (α = .883), with the values of previous research with similar age groups (Solmon & Boone, 1993).

Post-Testing

IMI. All three sub-scales in the post test, interest-enjoyment (α = .896), perceived competence (α = .886), and effort-importance (α = .869) were found to be consistent. These values are similar to previous research (McAuley, Duncan & Tammen, 1989).

Learning and Performance Orientations in Physical Education Classes Questionnaire. Internal consistency was found to be strong for both task environment orientation (α = .817) and ego environment orientation (α = .831).

Mean Scores

To report the mean scores of the treatment group and control group descriptive statistics were used. The treatment group had a higher mean score for post perceived competence (M = 28.92, SD = 5.60) than the control group (M = 26.54, SD = 6.68). The highest score that is possible for this scale is 42 points. The higher mean for the post perceived competence score tells us that the students in the treatment group perceived themselves to be more competent in their skills than the control group. The control group had a greater negative change in perceived competence (M = -4.58, SD 7.07) than the treatment group (M = -3.97, SD = 7.99). This indicates that the students in the control group perceived their competence in their skills had decreased more than the students in the treatment group.

The mean score of the post skill evaluation was higher for the control group (M = 129.49, SD = 33.32) than for the treatment group's score (M = 127.75, SD = 31.83). This score was out of a possible 280 points. The higher mean of the post skill evaluation tell us that the control group's overall skills were better than the treatment group's skills. The mean score for change in skills evaluation was similar for both groups. However, the standard deviation of the control group (M = 16.14, SD = 42.84) was larger than that of the treatment group (M = 16.12, SD = 37.69). A larger standard deviation means that the control group had a greater variance of participants' scores.

The mean scores for task and ego orientation were nearly the same for both groups. The task orientation score of the treatment group was (M = 29.67, SD = 4.23) and (M = 29.39, SD = 4.48) for the control group. The highest possible score was 35 points. The means for both groups are on the higher side of the scale and this means

that both groups were highly task oriented. The ego orientation score for the treatment group was (M = 17.08, SD = 6.10) and (M = 16.91, SD 5.53) for the control group. The highest possible score for this scale was 30 points. Therefore, the means for both groups are considerably lower than that of the task orientation scores. This suggests that the students came into the class motivated by learning new skills, not necessarily by the opportunity to beat others.

The mean scores for task and ego oriented environment were also similar for both groups. The task oriented environment score of the treatment group was (M = 55.21, SD = 5.83) and (M = 55.74, SD = 5.03) for the control group. The highest possible score for this scale was 65 points. This means that both groups experienced an environment that was conducive to learning new skills. The treatment group had a larger standard deviation with the ego oriented environment scores (M = 33.24, SD 9.23) than the control group (M = 33.41, SD = 6.54). The highest possible amount of points for this scale was 70 points. This means that the treatment group scores have a greater variance than the control group's scores. Both groups experienced a low ego oriented environment indicating that competition was not the main objective of the class. The means are the weighted sum of the items. All the mean scores of the treatment group are presented in Table 4.4 and the mean scores of the control group can be found in Table 4.5.

Table 4.4

Descriptive Statistics Treatment Group

	N	Mean	Std. Deviation
Age	37	21.76	2.47
Year	37	3.81	1.08
PostSkill	37	127.75	31.83
PreSkill	36	111.96	28.26
PreInterest	36	43.08	5.94
PrePC	36	32.89	6.26
PreEffort	36	30.11	4.78
Task	36	29.67	4.23
Ego	36	17.08	6.10
PostInterest	37	40.78	6.55
PostPC	37	28.92	5.60
PostEffort	37	26.64	4.39
TaskEnvironment	37	55.21	5.83
EgoEnvironment	35	33.24	9.23
Skillchange	36	16.12	37.69
PCchange	36	-3.97	7.99
Interestchange	36	-2.36	7.94
Effortchange	36	-3.56	6.47
Valid N (listwise)	34		

Table 4.5

Descriptive Statistics Control Group

	N	Mean	Std. Deviation
Age	34	21.88	2.63
Year	34	3.56	1.16
PostSkill	34	129.49	33.32
PreSkill	34	113.35	30.18
PreInterest	34	44.18	4.25
PrePC	34	31.12	6.24
PreEffort	34	28.38	4.91
Task	33	29.39	4.48
Ego	32	16.91	5.53
PostInterest	34	39.88	7.13
PostPC	34	26.54	6.68
PostEffort	34	24.53	5.82
TaskEnvironment	34	55.74	5.03
EgoEnvironment	34	33.41	6.54
Skillchange	34	16.14	42.84
PCchange	34	-4.58	7.07
Interestchange	34	-4.29	6.28
Effortchange	34	-3.85	5.16
Valid N (listwise)	32		

Hypothesis Testing

To test the first hypothesis, a one-way analysis of variance was conducted to test group differences in change of perceived competence, and change in skill. The changes in skill scores were used to determine the actual competence of the students. The actual competence scores were used to compare with the change in perceived competence scores. ANOVA results, presented in Table 4.6, showed no significant main effect for change of perceived competence ($F = .113$, $p < .738$) and skill ($F = .000$, $p < .998$). This means that both groups had a similar decrease in perceived competence.

To test if there were any differences in class environments, task oriented environment and ego oriented environment were also included in the analysis. ANOVA results, presented in Table 4.6, showed no significant main effect for task oriented environment ($F= .165$, $p < .686$) and ego oriented environment ($F = .008$, $p < .931$). This means that there was no difference in the environment that was experienced by both groups. A high task oriented environment was experienced based on the mean scores of both groups, treatment ($M = 55.21$, $SD = 5.83$) and control ($M = 55.74$, $SD = 5.03$). This means that the students perceived the environment of the class to be about learning new skills and not about trying to beat or be better than others.

Table 4.6

ANOVA Hypothesis 1

		df	F	Sig.
Task Environment	Between Groups	1	.165	.686
	Within Groups	69		
	Total	70		
Ego Environment	Between Groups	1	.008	.931
	Within Groups	67		
	Total	68		
Skill change	Between Groups	1	.001	.998
	Within Groups	68		
	Total	69		
PC change	Between Groups	1	.113	.738
	Within Groups	68		
	Total	69		

To see if there was a change in attitude between the groups, the change in interest-enjoyment and effort-importance were used. ANOVA results, presented in Table 4.7, were ($F = 1.267$, $p < .264$) for interest-enjoyment and ($F = .043$, $p < .837$) for effort-importance. This means that both groups thought that the classes were considered important and that they enjoyed it. There was no significant difference between the groups.

Table 4.7

ANOVA Attitude

		df	F	Sig.
Interest change	Between Groups	1	1.267	.264
	Within Groups	68		
	Total	69		
Effort change	Between Groups	1	.043	.837
	Within Groups	68		
	Total	69		

The first research hypothesis of the study was: The influence of adaptive learning strategies will significantly increase perceived competence of a tennis player. This hypothesis was rejected based on the statistical analysis between both groups change in perceived competence ($F = .113$, $p < .738$).

A one-way analysis for variance was used to test the second hypothesis. The initial skill level and the change in perceived competence were tested. The treatment group was split up in quartiles based on the data percentage range. When the pre test skill score of a student was between 66-93 points their score would be in the 0-25% range. A score between 94-102 would be in the 26%-50% range, 103-127 would be in the 51%-75% range, and 128-199 was in the 76-100% range. This was done to categorize the initial skill level of the students and make it possible to measure the second hypothesis. ANOVA results, presented in Table 4.8, showed no significant main effect change in perceived competence ($F = 1.501$, $p < .233$). This indicates that skill level was not a factor in how much a student would increase his/her perceived competence.

Table 4.8

ANOVA Hypothesis 2

		df	F	Sig.
PC change	Between	3	1.501	.233
Groups		32		
	Within	35		
Groups				
	Total			

The second research hypothesis was: The initial skill level of a tennis player will significantly influence the increase of perceived competence. This research hypothesis was also rejected based on the statistical analysis between the skill level of the students in the treatment group and the increase in perceived competence ($F = 1.501$, $p < .233$).

Correlations between Measures

Since there were no differences found between the groups, bivariate correlations were performed to see if there were any relationships between the

research variables. All variables were examined for each group. After the discovery of several relationships, the investigator picked out the relationships that were considered to be most interesting for this research.

In order to examine the bivariate relationships between change in perceived competence and change in skills, Pearson product-moment correlations were calculated. In the treatment group, change in perceived competence was significantly and positively related to change in skills ($r = .378$, $p < .05$) and change in effort-importance ($r = .342$, $p < .05$), see Table 4.9. This suggests that when a student's change in perceived competence increased, his/her change in effort/importance increased.

Table 4.9

Correlations Treatment Group

		E/Ichange	Skillchange	PCchange
E/I change	Pearson Correlation	1	-.002	.342*
	Sig. (2-tailed)		.993	.041
	N	36	36	36
Skill change	Pearson Correlation	-.002	1	.378*
	Sig. (2-tailed)	.993		.023
	N	36	36	36
PC change	Pearson Correlation	.342*	.378*	1
	Sig. (2-tailed)	.041	.023	
	N	36	36	36

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

In the control group, task oriented environment was significantly and positively related to change in effort-importance ($r = .381$, $p < .05$), see Table 10. When a student perceived a high task oriented environment the higher their change in effort-importance was. Ego oriented environment was significantly and negatively related to post effort-importance ($r = -.396$, $p < .05$), see Table 4.10. This means that

when an ego oriented environment was perceived the lower their effort/importance score was.

Table 4.10

Correlations Control Group

		Task Env.	Ego Env.	E/Ichange	Post E/I
Task Env.	Pearson Correlation	1	-.283	.381*	.508**
	Sig. (2-tailed)		.105	.026	.002
	N	34	34	34	34
Ego Env.	Pearson Correlation	-.283	1	-.082	-.396*
	Sig. (2-tailed)	.105		.646	.020
	N	34	34	34	34
E/I change	Pearson Correlation	.381*	-.082	1	.606**
	Sig. (2-tailed)	.026	.646		.000
	N	34	34	34	34
Post E/I	Pearson Correlation	.508**	-.396*	.606**	1
	Sig. (2-tailed)	.002	.020	.000	
	N	34	34	34	34

*. Correlation significant at the 0.05 level (2-tailed).

**. Correlation significant at the 0.01 level (2-tailed).

In both the treatment group and control group there was a significantly positive relationship between task environment orientation and post interest-enjoyment, treatment group ($r = .617$, $p < .01$), control group ($r = .439$, $p < .01$), and post effort-importance, treatment group ($r = .562$, $p < .01$), control group ($r = .508$, $p < .01$), see Tables 4.11 and 4.12. This means that for both groups, when a task oriented environment was perceived there were higher effort-importance and interest-enjoyment levels.

Table 4.11

Correlations Task Environment Treatment Group

		Task Env.	Post E/I	Post I/E
Task Env.	Pearson Correlation	1	.562**	.617**
	Sig. (2-tailed)		.000	.000
	N	37	37	37
Post E/I	Pearson Correlation	.562**	1	.747**
	Sig. (2-tailed)	.000		.000
	N	37	37	37
Post I/E	Pearson Correlation	.617**	.747**	1
	Sig. (2-tailed)	.000	.000	
	N	37	37	37

**. Correlation is significant at the 0.05 level (2-tailed).

Table 4.12

Correlations Task Environment Control Group

		Task Env.	Post E/I	Post I/E
Task Env.	Pearson Correlation	1	.508**	.439**
	Sig. (2-tailed)		.002	.009
	N	34	34	34
Post E/I	Pearson Correlation	.508**	1	.618**
	Sig. (2-tailed)	.002		.000
	N	34	34	34
Post I/E	Pearson Correlation	.439**	.618**	1
	Sig. (2-tailed)	.009	.000	
	N	34	34	34

**. Correlation is significant at the 0.01 level (2-tailed).

The results of this analysis indicate that both research hypotheses have been rejected. However, positive correlations between research variables have been found. The Treatment group had a positive correlation between the variables change in skill and change in perceived competence, while the control group had positive correlations between task oriented environment and change in effort/importance. Both groups perceived a highly task oriented environment which was linked with post effort/importance and post interest/enjoyment.

Table 13

Research Hypotheses

H1: The influence of adaptive learning strategies will significantly increase perceived competence of a tennis player.	Result: Rejected based on the statistical analysis between both groups of change in perceived competence ($F = .113$, $p < .738$).
H2: The initial skill level of a tennis player will significantly influence the increase of perceived competence.	Result: Rejected based on the statistical analysis between the skill level of the students in the treatment group and the increase in perceived competence ($F = 1.501$, $p < .233$).

Table 14

Correlations

Treatment Group Correlations:	Result:
PC change and Skill change	($r = .378$, $p < .05$)
PC change and Effort/Importance change	($r = .342$, $p < .05$)
Control Group Correlations:	
Task Environment and Effort/Importance change	($r = .381$, $p < .05$)
Ego Environment and post Effort/Importance	($r = -.396$, $p < .05$)
Both Groups:	
Task Environment and post Effort/Importance	Tr. group ($r = .562$, $p < .01$), c. group ($r = .508$, $p < .01$)
Task Environment and post Interest/Enjoyment	Tr. group ($r = .617$, $p < .01$), c. group ($r = .439$, $p < .01$)

CHAPTER 5

DISCUSSION

The main purpose of this study was to determine if the use of adaptive learning strategies increases the perception of physical competence of students in a leisure skills tennis class. The adaptive learning strategies that were used during the research were based on a new program developed by the International Tennis Federation (ITF). The program is based on beginning tennis players and was started for children under 10 years of age. This study modified the program to fit a college leisure skills tennis class with beginning adult tennis players. To the knowledge of the investigator, this is the first study done using the new program on adult beginning tennis players. A short explanation of how the tests of the research were done will be given before the actual interpretation of the hypotheses and results.

The variables that were used to find any significant differences were the change in perceived competence scores and change in skill scores. The pre and post tests were set up in a manner that the students were asked to do a skills test first and then answer the perceived competence questionnaire. The order of the testing was chosen because it was considered the best sequence for the students to have more accurate perception on their competence of the activity.

Hypothesis 1

The first research hypothesis was: the influence of adaptive learning strategies will increase perceived competence of a tennis player. The research hypothesis was rejected because there was no significant difference between the treatment group and the control group. Multiple factors could have influenced the rejection of the research

hypothesis such as the perceived competence post test scores, the method of teaching by the control group instructor, the perceived task oriented environment, and the specific equipment that was used.

First, many perceived competence post test scores were lower than the perceived competence pre test scores. The change in perceived competence scores were therefore mostly negative scores. The lower post test scores mean that before the program started many students thought they would be better in the activity and then they found out that the activity was more difficult than they expected. The curriculum that was used could have been too hard to learn new skills for the students.

Another explanation could be that the students had low expectations, because they had not gone through the program yet. This made it easier for the students to exceed their expectations and increase their perceived competence (Boyd & Yin, 1996). By the second skills test the students had gone through the program and had higher expectations of their skills. Students did not exceed their expectations and it resulted in a lower outcome of the perceived competence scores.

The second factor that could have influenced the change in perceived competence is the manner in which the control group instructor taught the class. The investigator and the assistant coach of the men's varsity tennis team did two checkpoints to make sure that the treatment group and the control group were not taught in a similar manner. The checkpoints revealed that the control group instructor used similar teaching techniques as the treatment group instructor.

The checkpoints were done based on the specific goals of the treatment group. The treatment group had an average of 53 behavioral observations in the instruction/feedback column and the control group had one checkpoint of 42

behavioral observations, see Appendix A. The other checkpoint of the control group only had seven behavioral observations because it was a day on which the students competed against each other.

The first checkpoint that was done on the control group showed that the students played doubles matches against each other the entire class. During that day, the instructor would explain the rules of the game with the help of a student but did not give much feedback when students started playing the matches. That is why there were only seven behavioral observations during that day. The second checkpoint revealed that the instructor gave instructions of how to hit a ball with a specific stroke and had a student helping with the demonstration of the stroke. After the instruction and demonstration, the students would practice with each other. The instructor would then walk around and give feedback to the students. The type of feedback that the instructor used depended on what the student did. For example, if a student hit a good shot, the instructor would acknowledge this by saying "good forehand" or when a student did not hit a good shot the instructor would either encourage the student or tell them what they should do to fix his/her stroke.

Besides the checkpoints the investigator found out that the control group instructor had a tennis teaching professional helping during one of the classes. This is a person who is certified to teach tennis by the USTA. The tennis professional came to class to teach students the proper manner to learn strokes and help the control group instructor teach the students the strokes.

Both checkpoints of the treatment group were similar to the second checkpoint of the control group. The instructor gave instructions and did a demonstration with the student. After the instruction and demonstration, the students practiced with each

other and the instructor walked around and gave feedback to the students during the exercises. The instructor used the feedback that was selected for that specific day.

The third factor is the task oriented environment that was perceived by both groups. Data analysis revealed that both groups experienced a highly task oriented environment. This could be explained by the similar teaching techniques used by both instructors. Both instructors created an environment that was conducive of learning new skills. For example, both instructors gave instructive feedback when a student used poor technique on a stroke. The instructor would tell the student why the technique was poor and how the stroke should be hit instead. This increased the knowledge of the student on which technique to use and how to practice the stroke.

According to Escarti and Gutierrez (2001), when a task oriented environment is perceived, students develop success criteria based on learning new skills and increasing knowledge. They are interested in the physical activity for the pleasure this activity provides. Boyd and Yin (1996) suggested that individuals with task oriented goals provide themselves with the opportunity to increase competence through enjoyment. For example, when an individual puts a lot of effort in improving a skill and when he/she sees the improvement he/she enjoys him/herself more. The combination of these results can explain why there was no significant difference between the two groups. However, it does not explain why their perceived competence went down. Based on Boyd and Yin (1996), perceived competence should have increased. Both environments were highly task oriented and therefore the students adapted success to effort and enjoyment. Both groups could have had the same kind of improvement in perceived competence because of the task oriented environment.

A fourth possible factor that could influence the results is the students' competence as they progressed through the different stages of the program. For example, a student is more successful when he/she plays six or seven balls over the net and in the court with the orange dotted ball because it is softer and the student has more time to set up and hit the ball. The student thinks he/she is good at playing tennis, because of the many balls they hit. They then progress to the pressureless ball that makes it harder to keep the ball in play, because it has a higher compression and therefore, students' perceived competence may decrease. The student then plays with the regular tennis ball, the third stage of progression, and has an even harder time keeping a rally going and keeping the ball in play. His/her perceived competence decreases even more and at that point they have to take a skills test and are asked to complete the questionnaire.

Hypothesis 2

The second hypothesis was: the initial skill level of a tennis player will influence the change of perceived competence. When a student had a higher skill level, the increase in perceived competence is likely be less than for a student who had a lower skill level, because the stages of the program were specifically for beginning tennis players. Students with previous experience have already been taught the basics and therefore they do not need the use of slower balls. This research hypothesis was also rejected. Factors that could have influenced the rejection of the hypothesis are the skills test and exercises during the program.

The first factor that could have had an influence is the inaccurate reflection of skill through the score of some students. For example, a student who knows how to hit with effect (spin or slice) usually has a higher skill level than someone who does

not know how to hit with effect. The skills test scores do not reflect that properly. A beginner can play loopy balls and get a score that is just as good as that of the more experienced player who can get a lower score because he/she is trying to hit his/her best ball but misses. When the beginner would play against the more experienced player, the more experienced player would win because they know how to play with effect and/or play at a higher tempo.

When a beginning tennis player sees that he/she has a similar score to that of a more experienced player than they might have thought they have a similar skill level. Having a similar skill level as a more experienced player would exceed the expectations of the beginning tennis player. This could have resulted in a high perceived competence score by the students which was demonstrated on the pre test scores. According to Boyd and Yin (1996), performing one's best or beyond personal expectations provides perceptions of competence for those who are task-involved. During the program, the beginners found themselves to not be as good as they perceived they were. This could have played a role in the beginners' answers on the post test. They did not exceed their expectations during the post test and a decrease in perceived competence was demonstrated.

The second factor that could have influenced the results is the fact that the students who were considered better in the activity would get bored of the exercises of the curriculum. According to Gaudagnoli and Lee (2004), task difficulty should increase parallel to the increase of the student's self-efficacy and perceived competence. The exercises were not up to the level of these players and therefore the treatment group instructor made adjustments to the exercises so that they would be more challenging to the better players. For example, instead of just playing a volley-

volley rally to each other, the instructor made one student hit straight and the other student crosscourt. Solmon and Boone (1993) concluded that when task oriented students picked exercises with a higher difficulty they demonstrated more effort and persistence in class. The increase of difficulty during the exercises might have led to more effort and persistence by the advanced students which increased their self-efficacy and their perceived physical competence by as much as the beginning tennis players with the normal exercises.

Since both research hypotheses were rejected, the investigator wanted to identify any other relationships that may have been present between the variables that were used for this research. This was done to see if the variables could provide further explanations to why both hypotheses were rejected. All variables that were used for the hypotheses and the variables that have shown to have a direct relationship in previous studies were analyzed. These include the effort-importance and interest-enjoyment subscales of the IMI. Escarti and Gutierrez (2001) used the same IMI subscales to test the effects of the goal oriented environment of a physical education class on the motivation, interest, and intention to practice physical activity or sport. Like the present study their study was also based on the achievement goal theory.

Bivariate correlations were found for both groups and for the treatment group separately. Both groups had correlations between task orientation environment, effort-importance post scores and interest-enjoyment post scores. There was a bivariate correlation found in the treatment group between perceived physical competence, effort-importance and skills evaluations. These relationships were not found in the control group.

The teaching methods of the instructors could have had an influence in the bivariate correlation between task orientation environment and effort-importance post scores (treatment group .562, control group .508). This could also have influenced the correlation between task environment and interest-enjoyment post scores (treatment group .617, control group .439). The instructors had a similar kind of teaching method (53 observations for the treatment group and 42 observations for the control group) and both groups perceived a task oriented environment (treatment M = 55.21, SD = 5.83; control M = 55.74, SD = 5.03). The positive relationships between task environment, post effort-importance scores, and post interest-enjoyment scores have been found in previous studies.

A task oriented perspective is linked to persistence in participation (Duda, 1989), a belief that success is dependent on effort (Ames & Archer, 1988; Solmon & Boone, 1993) and greater levels of sport enjoyment (Boyd & Yin, 1996). This illustrates that when students put a lot of effort into a task they think that they will be more successful at the task. The participants in this study could have adopted the same thoughts that success is dependent on effort. For example, the instructor gave feedback to a student by saying that hitting the ball in the middle of the racket would make the ball go deeper. There was an exercise during the program that gave points for hitting the ball deep. The students can then see that their effort of practicing hitting the ball in the middle of the racket can lead to success in that exercise.

For the treatment group, there was a correlation between change in perceived competence scores and change in skills scores but there was no correlation in the control group. This means that the higher someone's increase in skill was, the higher his/her increase in perceived competence. This is a logical correlation because when

an individual has improved his/her skills of the sport, he/she should feel more competent in his/her skills (Boyd & Yin, 1996). However, the equipment, feedback and exercises used in the treatment group could have had an influence on the skills improvement of the students. A possible reason could be that some aspect of the program, such as the use of different balls, helped the students increase their perceived competence. The equipment and or exercises might not have been used in a proper manner or were not used long enough to make a significant difference.

The ITF (2007) developed the program and its equipment specifically for children under 10 years old and beginning tennis players. Children could play with the equipment for multiple years and develop their skills. Beginning tennis players not in a semester long class have more time to develop their skills because they are not restricted to a four month academic semester. The investigator had a semester and only used 6 weeks to develop the skills of beginning tennis players, based on the ITF manual (2007) and a previous study done by Solmon and Boone (1993). When the program is adjusted for the entire semester the results might be different.

The change in effort-importance scores were related to the change in perceived competence scores in the treatment group but not in the control group. The higher the increase of a student's effort-importance, the higher the increase was in his/her perceived competence. This means that when students put more effort into the class, their perceived competence increased as well. The task oriented environment in combination with the use of equipment during this study can be one possible reason for this correlation.

A task oriented environment related to greater levels of effort and perceived competence was also found in previous studies (Escarti & Gutierrez, 2001; Ntoumanis

& Biddle, 1999; Theeboom De Knop, & Weiss, 1995). The equipment and exercises of the treatment group were part of a task oriented program that was conducive to learning new skills and increasing the perceived competence of the students (ITF, 2007). The equipment made exercises easier, because it lowered functional task difficulty and could have been the link between the variables that were found in the treatment group. The task oriented environment and the lowering of functional task difficulty could have increased the effort of the students to improve their skills, their increase in perceived competence, and enjoyment.

Limitations

Three limitations of this study, different instructors, weather conditions/practice schedule, and use of equipment, were observed by the investigator that could have influenced the outcome of the study. First, the use of different instructors resulted in a similar environment for both groups. Second, the weather conditions/practice schedule disrupted the learning curve of the class. Finally, the use of a substitute ball could have influenced how students perceived certain exercises. Having different instructors was a limitation to this study. The control group instructor had no knowledge of what the treatment group instructor was doing during the program other than the use of different equipment. Check points revealed that the control group instructor used the same kinds of methods that the treatment group instructor used. For example, both instructors used students for the instructions and demonstrations of the strokes. Both instructors also let the students practice by themselves and the instructor gave feedback. This likely resulted in the similar task oriented environment for both groups.

A limitation of this study was the weather conditions and the inability to move indoors due to the practice schedule of the men's varsity tennis team. The treatment group instructor had to cancel four classes due to bad weather and not having the option to go indoors because of the men's tennis practice schedule. This means that the students only played an hour and 15 minutes for three weeks, instead of two and a half hours. One class was made up on a different date so the students would get more than one class a week. Therefore, the weather conditions disrupted the learning curve of the students.

The control group instructor only did not have to cancel class during the entire program. However, the control group instructor did split up the class for the first couple of classes of the semester to make sure that everybody could play if it was necessary to go indoors. This was not necessary because the weather was good enough to play outside all but one day. Both groups had 10 classes before the post skills test was conducted.

Another limitation to the study could have been the use of equipment. The ITF manual had three specific balls for its program and during this study one of the balls was substituted for another ball. The green dotted ball could not be purchased in the United States; therefore the green dotted ball was replaced with a pressureless ball. The pressureless ball had a higher compression than the orange dotted ball and a lower compression than the regular tennis ball. This was the same requirement as the green dotted ball and the pressureless ball was therefore used as the substitute. This could have affected the outcome of the study because the original ball of the program was not used.

Practical Application

This research showed that the newly designed program developed by the ITF did not result in a significant difference in perceived competence between the new teaching methods and the traditional teaching method of the leisure skills tennis class. Although the impact of the ITF program was not significant, it did improve the participants' perceived competence and skills. There were also some positive correlations between these variables. The use of equipment and the specific exercises could give a possible explanation for these relationships.

The equipment and or the specific exercises of the program could be implemented in the traditional method of teaching. The slower balls can be especially useful when there are students whose eye-hand coordination is not as fast as the tennis ball that is hit to them. The slower balls might not increase their perceived competence greatly, but they will be able to play exercises and points longer. This should at least increase their perception of success depending on effort that a task oriented environment induces.

The traditional teaching method can be used with these balls or at least one of the two slower balls. The investigator talked to some of the students in the treatment group and they said that they hit well with the lower compression balls. To keep students engaged during class, the pressureless ball could be used when a beginning player plays against a more advanced player. This ball feels more like a regular tennis ball but will not go as fast so that the beginning player can still hit the ball back.

The present study confirmed that there was a relationship between a task oriented environment and intrinsic motivation. This was evident through the correlation that was found between a task oriented environment and the interest-

enjoyment and effort-importance subscales. Greater intrinsic motivation leads to a positive influence on the intention to participate and on learning new skills (Escarti & Gutierrez, 2001). This is important because it tells us the environment and program that was created during this research gives the students a positive experience and makes them want to learn new skills. Other leisure skills instructors could use the curriculum that was created for this study as a guideline to construct their own task oriented environment.

This outcome is in line with pervious research done on task oriented environments (Duda, 1989; Escarti & Gutierrez, 2001). Future leisure skills instructors should therefore continue to create an environment that is task oriented. It has been demonstrated that students will put more effort into the class (Duda, 1989), will experience more enjoyment (Escarti & Gutierrez, 2001), and show a higher increase in their perceived competence (Boyd & Yin, 1996) than when an ego oriented environment is perceived.

Future Research

Future research can make three adjustments regarding the set up of the present study. First, there can be a retrospective pre-post test design. This will allow the students to use their personal knowledge of tennis after going through the program and give a more accurate answer on what they have learned and how much they increased in perceived competence. This should be done because the students in this study did not have a point of reference on their perceived competence when they were asked to rate it on the pre test and therefore the pre test scores were high.

Second, the same kind of research can be done with a more equal amount of males and females instead of having a majority of males. Previous research has

demonstrated that females tend to be more task oriented (White and Zellner, 1996), but the percentage of females (26.8%) in this study was not a good sample to make a gender based conclusion for this study. A better balance between males and females gives a better representation of both genders and better conclusions can then be drawn between genders.

Third, the students can be asked why they take the class in the first place. This is to get more information on their motivation to enter into a leisure skills tennis class. A student's motivation can give a better explanation on why certain outcomes of this study were seen, such as why the students had a high task orientation, high ego orientation or both in these classes. Students could have taken the class to learn tennis and enjoy themselves, to graduate, or to simply get a high grade.

The next step in this investigation of perceived competence in a leisure skills tennis class can be the modification of the curriculum and testing. This study and its curriculum were over a span of 13 classes. The study was consisted of a class introducing students to tennis in general, nine class periods with a different ball (three periods per ball), one class playing points with a regular tennis ball, and two testing days. Future research can make a curriculum that enables the students to use the different balls over a longer period of time. Instead of using each ball for only three classes, future researchers can use each ball for four, five or six classes. This would give the students more time to get familiar with the balls before they progress to another stage.

During the curriculum that was based on the ITF manual, the repetitiveness of the exercises resulted in the decline of students' work ethic. Students who were considered to be better in the activity by the instructor showed a decline in their

attitude towards the exercises. For example, a student would purposely try to hit the other student or hit the ball outside of the court. This was not the objective of the exercise that was given by the instructor. Future research could improve the attitude of the students by using other exercises to make the class less repetitive or make exercises more challenging. For example, when students are trying to hit targets, every time they hit the ball outside the lines, a point will be deducted.

Another way to adjust the lesson plan is to have a class period where the students just play points. A way to do this is to have two classes with exercises and the third one playing only points. Previous research has shown that the combination of having a task and ego oriented environment can be more beneficial than an environment that is solely task oriented. In 1999 Steinberg, Singer, and Murphey demonstrated that a multiple goal strategy increases the intrinsic motivation of participants in a sport setting. "According to their scores on the IMI, participants in the mastery (task)-competitive (ego) goal group significantly increased in both their task interest and task effort as a function of training (Steinberg, Singer, & Murphey, p. 418)."

A multiple goal environment would require the research to be conducted over a longer span of time than the present study. The entire length of the semester could be used for future research. Multiple testing days can be used to follow the progress of the participants' perceived competence per ball. By testing after every type of ball future researchers could get a better view of which ball increased the student perceived competence more. For example, if the orange dotted ball increases the student's perceived competence by a lot and the pressureless ball does not increase the student's perceived competence by as much then the orange dotted ball could be

used for a longer period of time or the pressureless ball for a shorter period of time or not at all. A new and specific curriculum for students of a college leisure skills tennis class can then be constructed to fit the appropriate use of the balls.

Conclusion

The main purpose of this study was to determine if the use of adaptive learning strategies increases the perception of physical competence of students in a leisure skills tennis class. This study modified the newly developed ITF program to suit beginning tennis players in a leisure skills tennis class. The modified program did not create a significant change from that of the traditional teaching methods used in the leisure skills tennis classes. Direct links between variables could not be made due to the limitations of this research. However, bivariate correlations were found between research variables in the treatment group and not in the control group. Future research can build on those correlations to research a better program to test perceived competence.

The rejection of the hypotheses was partially explained by the similar environments that the students perceived during the program. The perception of having a highly task oriented environment in both groups was caused by the similar teaching methods of both instructors. This could have lead to a similar increase of skill, perceived competence, interest-enjoyment, and effort-importance for both groups. Therefore, no significant differences between the two groups in those variables were found.

However, there were differences in bivariate correlations between the treatment group and the control group. There was a relationship between the perceived competence scores and the skills scores of the treatment group but not in

the control group. The treatment group had specific equipment and exercises to increase perceived competence, the control group used the traditional teaching methods. Therefore, the two variables (equipment and exercises) could have influenced the correlation that was found in the treatment group but not in the control group.

Future research could find out what parts of the program could be best used for a leisure skills tennis class. The traditional teaching method in combination with those parts of the program could be beneficial for future students in a leisure skills tennis class. It could make the leisure skills tennis class more useful for students with different skill levels and create a more positive experience for all participants.

APPENDICES

Appendix A

Check Sheet

CHECKLIST OBSERVER

Date:				
		Exercise #1	Exercise #2	Exercise #3
Equipment				
Tennis Ball	Regular			
	Orange/Pressureless			
Use of Cones	Yes/No			
Climate				
The length of the court:	Full Length			
	Threequarter Length			
	Service Box			
The width of the court:	Doubles Court			
	Singles Court			
	Half Court, Down the line			
	Half Court, Cross Court			
Total # of students on 1 court				
		Exercise #1	Exercise #2	Exercise #3
		Tally	Tally	Tally
Instructions/Feedback				
Modeling of stroke/exercise	Teacher			
	Student			
Specific stroke details	Stands			
	Swing			
	Ball Placement			
	Strike Zone			
Feedback	Instructive			
	Prompting			
	Corrective			
	Praise			

Appendix B

Curriculum

Curriculum Leisure Skills Tennis Course

Time schedule of class:

Part1: The students will hit with a regular tennis ball for the first 15 minutes of class. In this stage the students will hit around with each other until every student of the class is present. The instructor will explain what will be done during class and what ball will be used.

Part 2: The instructor will explain the two exercises of this stage in more detail and will model the technique of strokes, stands and swings needed during the exercises. Both exercises will last about 15 minutes each.

Part 3: The students will play games based on the exercises done in stage 3. The games are played using score count by ones (1-0, 2-0, 2-1). Two different kinds of games are played during this stage; both games will last 15 minutes each.

Explanation of Stages:

Stage 1: Students will use an orange dotted ball, and will play on three quarter length of a court. The ball is 50% slower than a regular tennis ball and ideal for starter players, of all ages.

Stage 2: Students will use a green dotted ball, and play on a full length of a court. The ball is 25 % slower than a regular tennis ball and ideal for introduction to a full court.

Stage 3: Students will use a regular tennis ball, and play on a full length of a court.

Week 1:

Class 1: Syllabus overview, introduction of the class and research (classroom)

Class 2: Introduction of basic grips, stands, and swings. The students will have time to get familiar with tennis hitting to each other and figure out how to hit a tennis ball.

Week 2:

Class 3: A skills test to measure their level of ability followed up by a questionnaire about perceived competence, perceived tennis shot ability and goal orientation.

Week 2:

Start of the program.

Class 4: Ground stroke skills. (Stage 1)

General Outcomes:

- Basic knowledge and experience of forehand and backhand ground strokes
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a forehand and backhand ground stroke
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with an orange dotted ball
- Instruction of the lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: Playing a 10 ball rally on three-quarter length of half a court
    - Exercise #2: Playing a 10 ball rally on three-quarter length of half a court, cross court
    - When the amount of balls is reached in an exercise the students will rotate partners
    - Both exercises are played one-on-one
    - Both exercises will be done 4 times 4 minutes if the amount of balls is not reached
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: A groundstroke game and the point will start after the first 3 balls of the rally
- Game #2: Ping-pong doubles, a doubles team will alternate returning shots of their opponent. Played on a full court without doubles allies
- Both games will be played for 3 times 5 minutes and the winning player or team will move to the right and the losing player or team will move to the left.

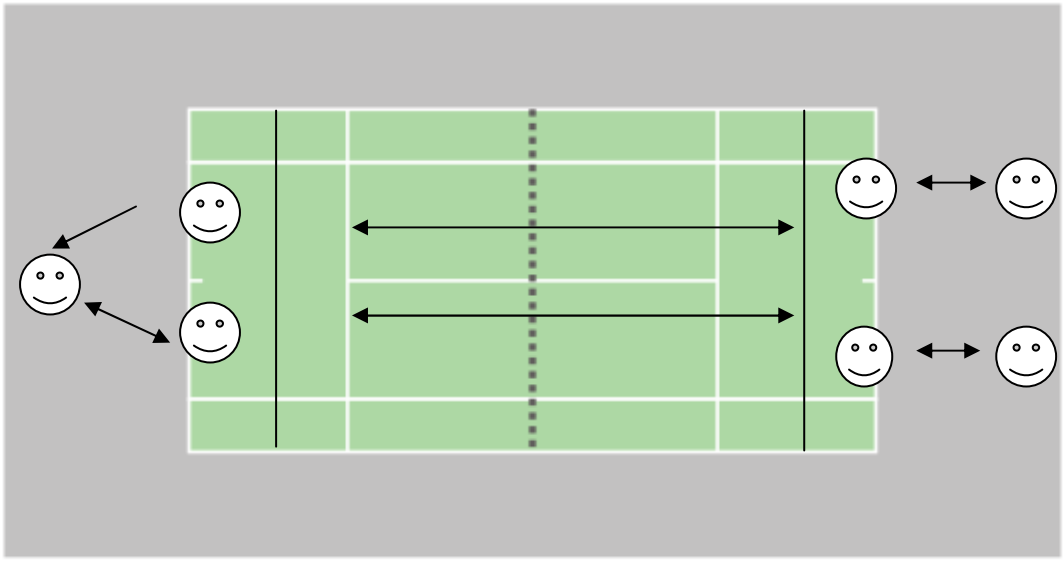
Equipment & Climate Modifications

- All exercises and games will be played with the orange dotted ball
- All exercises and games will be played on three quarter length of half a court

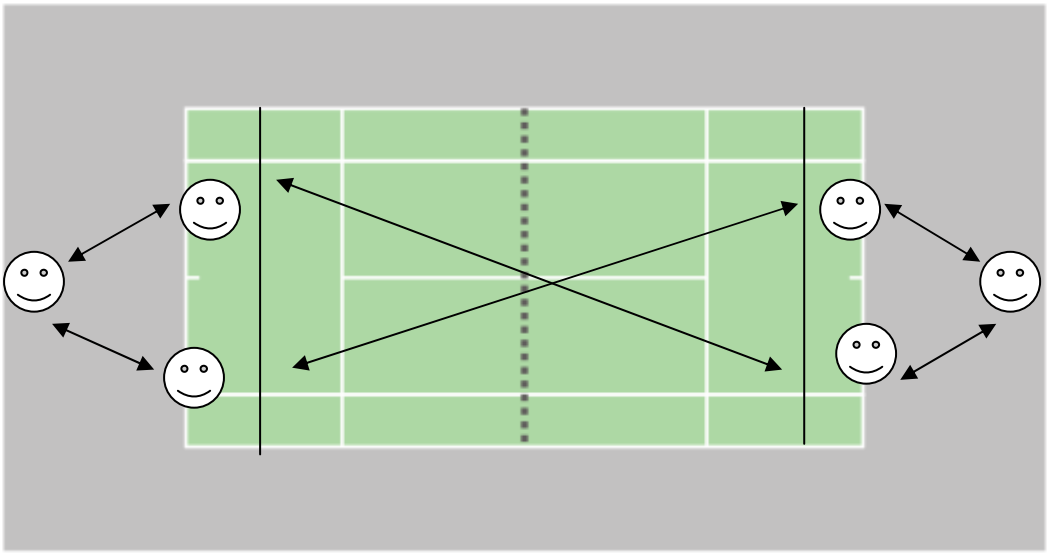
Specific Research Components

- The instructor will demonstrate stands and swings of the ground strokes before the start of the exercises (modeling)
- If necessary the exercises will be adjusted to the skill level of the player (task difficulty)
- The instructor will use instructive feedback and prompting (feedback)

Exercise #1



Exercise #2



Total session time: approximately 1hour and 17 minutes
Total rest time: approximately 8 minutes

Week 3:

Class 5: To play consistent approach and volley. (Stage 1)

General outcomes:

- Basic knowledge and experience of forehand and backhand approach shots and volleys
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a forehand and backhand volley
- Knowledge and experience of stands and swing of a forehand and backhand approach shot
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with an orange dotted ball
- Instruction of the day's lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: Playing a 10 ball volley rally inside the service box of half a court.
    - Exercise #2: One person feeds a shorter ball the other person hits the ball and comes to the net and hits 4 volleys and then rotates to the other side of the court.
    - When the amount of balls is reached in an exercise the students will rotate partners
    - Both exercises are played one-on-one
    - Both exercises will be done 6 times 3 minutes if the amount of balls is not reached
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: Both players are on the service line and make a volley rally. The ball cannot touch the ground; the point starts after the first 3 balls of the rally.
- Game #2: Volleyball doubles: The entire service box of a full court will be used. Partners can hit towards each other one time before hitting the ball over the net. The ball may bounce once when it goes over the net, but the ball cannot bounce when it is played to the partner.
- Both games will be played for 3 times 5 minutes and the winning player or team will move to the right and the losing player or team will move to the left.

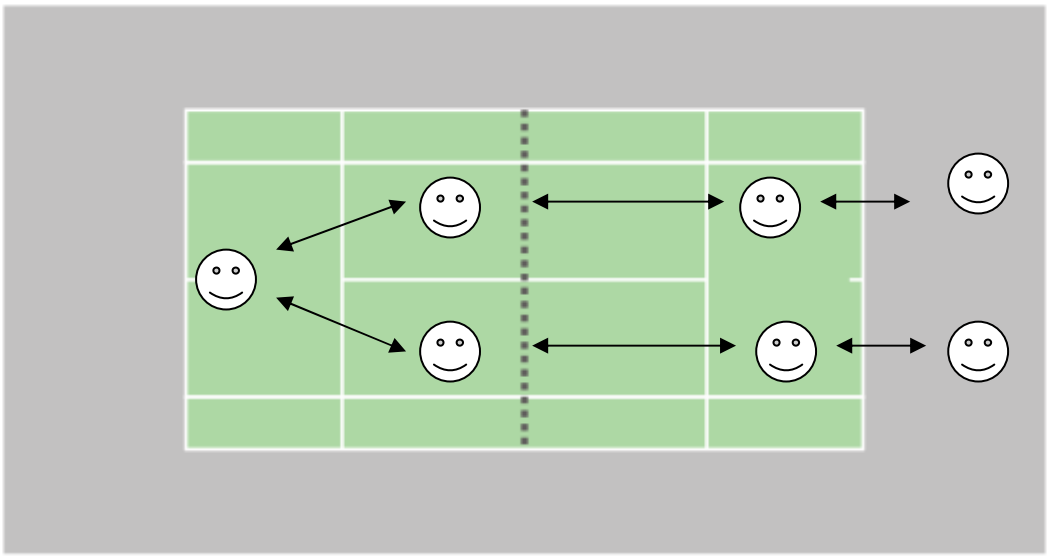
Equipment & Climate Modifications

- All exercises and games will be played with the orange dotted ball
- Exercise #1, game #1 and game #2 will be played on a mini-court
- Exercise #2 will be played on three-quarter of a court

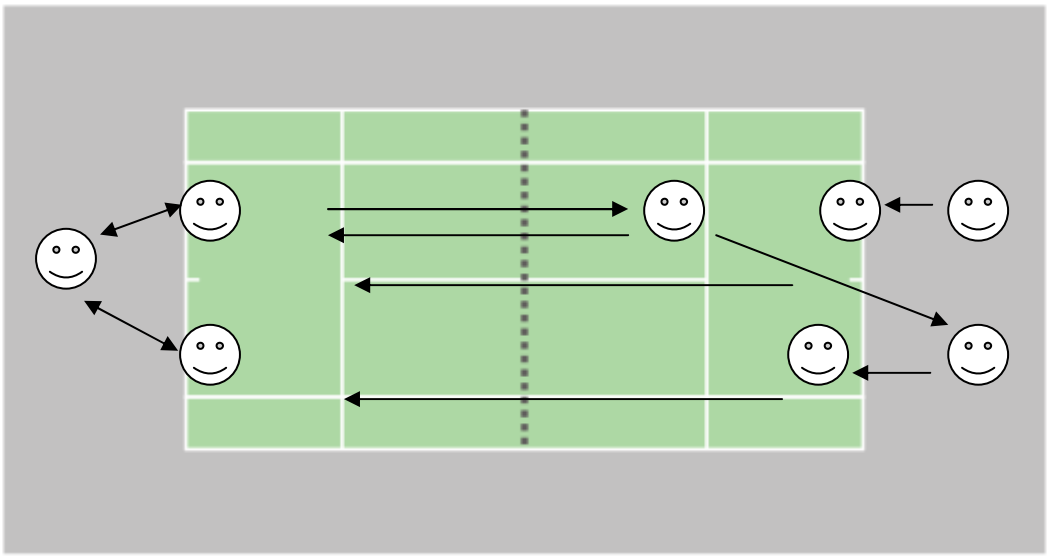
Specific Research Components

- The instructor will demonstrate stands and swings of the approach shot and volleys before the start of the exercises (modeling)
- If necessary the exercises will be adjusted to the skill level of the player (task difficulty)
- The instructor will use instructive feedback and prompting (feedback)

Exercise #1:



Exercise #2:



Total session time: approximately 1 hour and 17 minutes
Total rest time: approximately 8 minutes

Class 6: To play consistent service and return (Stage 1)

General outcomes:

- Basic knowledge and experience of service and return of service
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a service
- Knowledge and experience of stands and swing of a return of service
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with an orange dotted ball
- Instruction of the day's lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: One student will hit a service the other student will return a service. When this is done right their team has 1 point
    - After 10 points the students will switch functions
    - Exercise #2: All students will be split up into 4 groups, one group per court. The groups have to try and hit cones, placed in the service box, with their service
    - Exercise #1 is played one-on-one
    - Exercise #2 is played with groups of 4-5 students
    - Exercise #1 will be done 4 times 4 minutes if the amount of balls is not reached
    - Exercise #2 will be done until there are no more balls in the carts or if all the cones are hit.
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: will be played on half a court, cross court. The point will start after the server placed the service inside the service box and returner hit the return back inside the court.
- Game #2: Multiple servers try to win three points to become a returner. There are few returners on one side and multiple servers on the other side.
- Game #1 will be played for 3 times 5 minutes and the winning player or team will move to the right and the losing player or team will move to the left.
- Game #2: Will be played for 15 minutes.

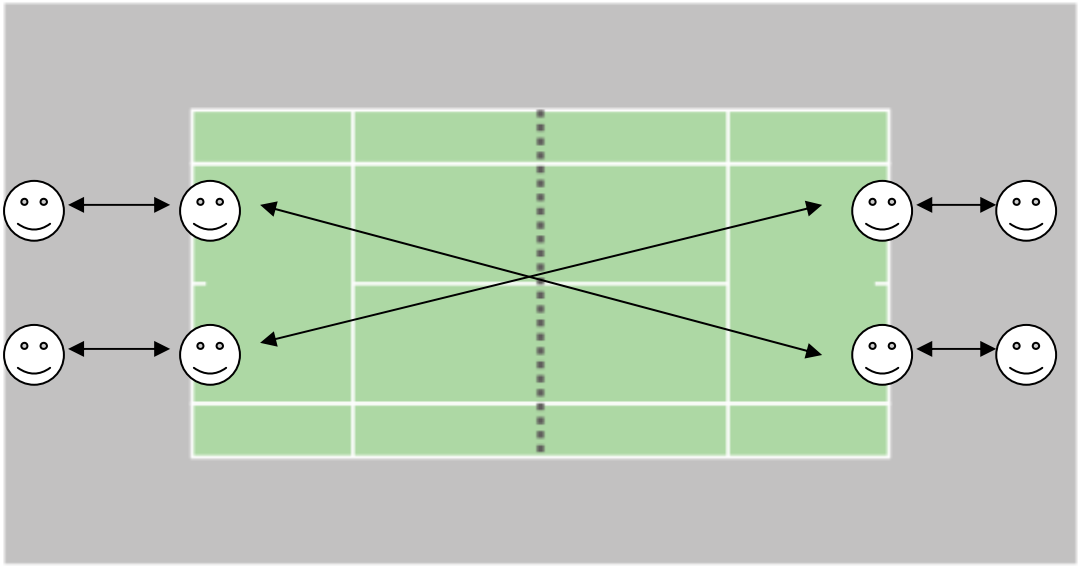
Equipment & Climate Modifications

- All exercises and games will be played with the orange dotted ball
- Both exercises will be played on three quarter court
- Both games will be played on three-quarter of a court

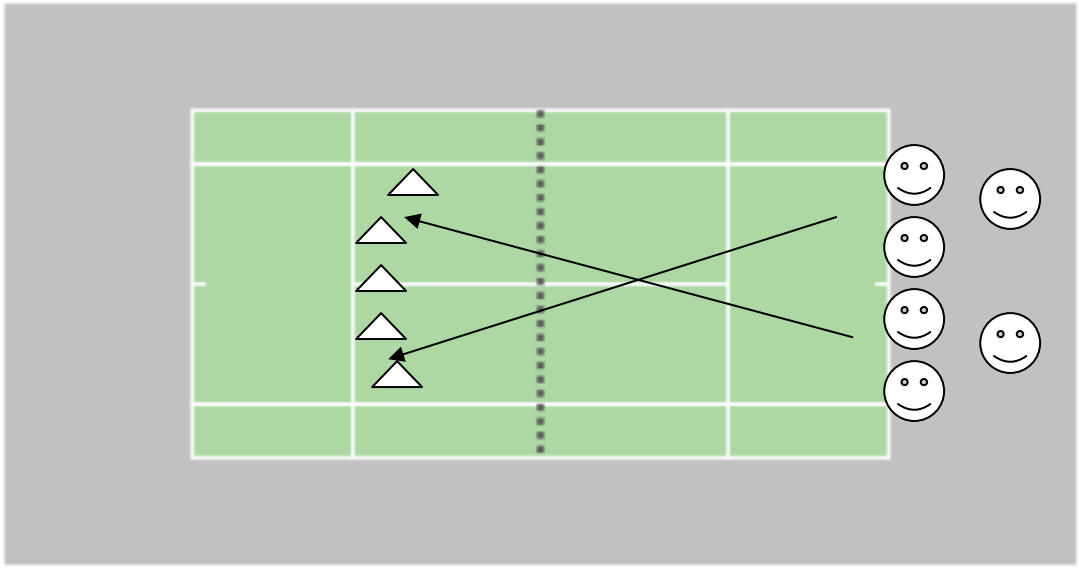
Specific Research Components

- The instructor will demonstrate stands and swings of the service and return of service before the start of the exercises (modeling)
- The instructor will demonstrate the exercises and if necessary adjust the challenge to the skill level of the player (task difficulty)
- The instructor will use instructive feedback and prompting (feedback)

Exercise #1:



Exercise #2:



Total session time: approximately 1 hour and 17 minutesTotal rest time: approximately 8 minutes

Week 4:

Class 7: To play a consistent groundstroke rally (Stage 2)

General Outcomes:

- Basic knowledge and experience of forehand and backhand ground strokes

- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a forehand and backhand ground stroke
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with a green dotted ball
- Instruction of the lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: Playing a 10 ball rally on full length of half a court
    - When the amount of balls is reached the students will rotate partners
    - Exercise #2: The students will have to hit the ball passed a line 10 times that is drawn on three quarter court on the other side. They will play on full length of half a court
    - When the amount of balls is reached, the students switch functions
    - Both exercises are played one-on-one
    - Both exercises will be done 4 times 4 minutes if the amount of balls is not reached
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: A groundstroke game played on half a court and the point will start after the first 3 balls of the rally
- Game #2: A student will start with a service and the point will be played out on half a court, cross court
- Both games will be played for 3 times 5 minutes and the winning player will move to the right and the losing player will move to the left.

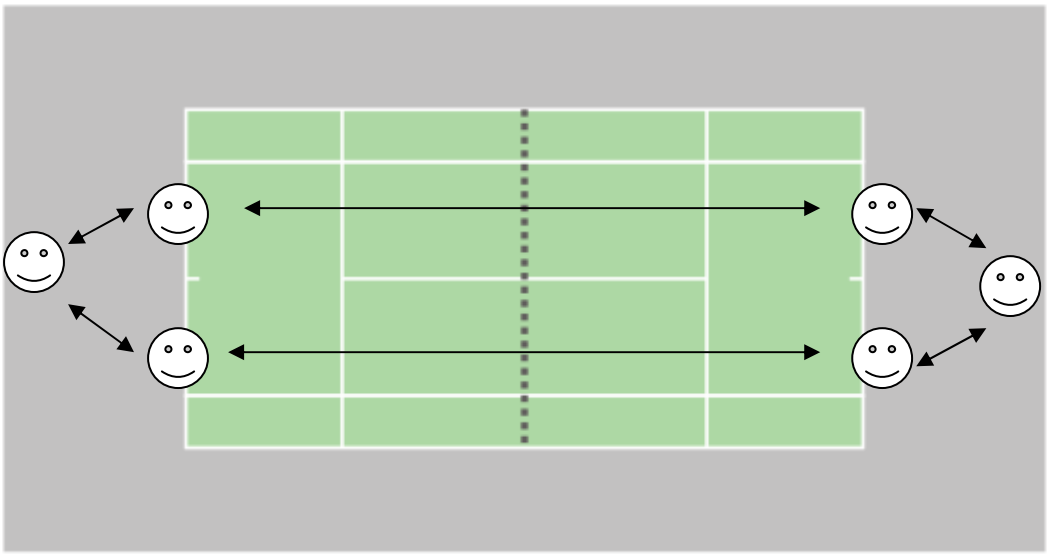
Equipment & Climate Modifications

- All exercises and games will be played with the green dotted ball
- All exercises and games will be played on full length of half a court

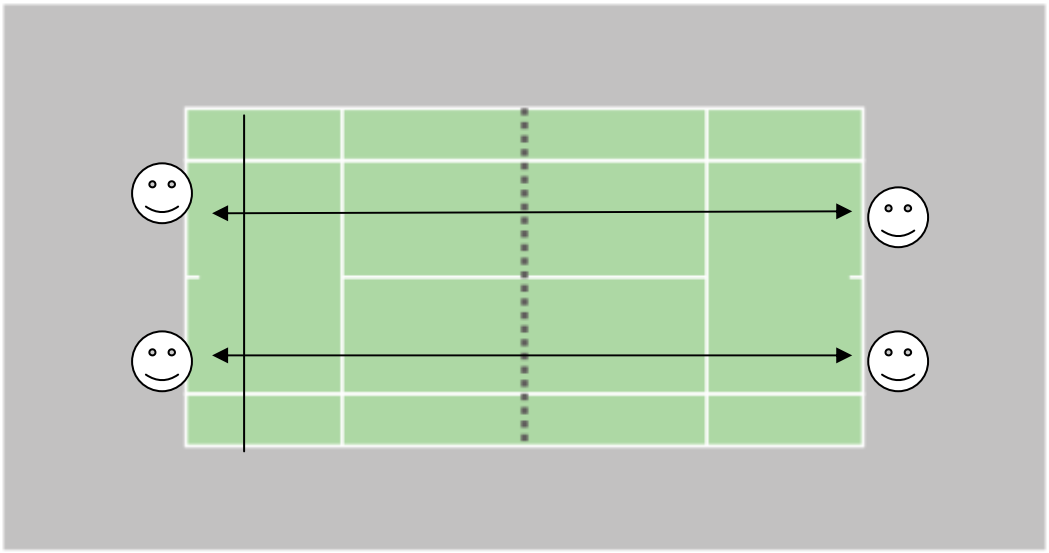
Specific Research Components

- The instructor will have students demonstrate stands and swings of the ground strokes before the start of the exercises (modeling)
- If necessary the exercises will be adjusted to the skill level of the player (task difficulty)
- The instructor will use corrective feedback and prompting (feedback)

Exercise #1:



Exercise #2:



Total session time: approximately 1 hour and 17 minutes.
Total rest time: approximately 8 minutes.

Class 8: To play consistent approach and volley. (Stage 2)

General outcomes:

- Basic knowledge and experience of forehand and backhand approach shots and volleys
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a forehand and backhand volley
- Knowledge and experience of stands and swing of a forehand and backhand approach shot
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with a green dotted ball
- Instruction of the day's lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: Playing a 10 ball volley rally inside the service box of half a court.
    - Exercise #2: One person feeds a shorter ball the other person hits the ball and comes to the net and hits 4 volleys and then rotates to the other side of the court
    - When the amount of balls is reached in an exercise the students will rotate partners
    - Both exercises are played one-on-one
    - Both exercises will be done 4 times 4 minutes if the amount of balls is not reached
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: Both students start on the baseline on half a court. One student feeds a shorter ball and then the point starts.
- Game #2: both students start on the baseline on half a court. The point starts after the first 3 balls and when the point is won with a volley (direct or indirect) that person will get 2 points.
- Both games will be played for 3 times 5 minutes and the winning player or team will move to the right and the losing player or team will move to the left.

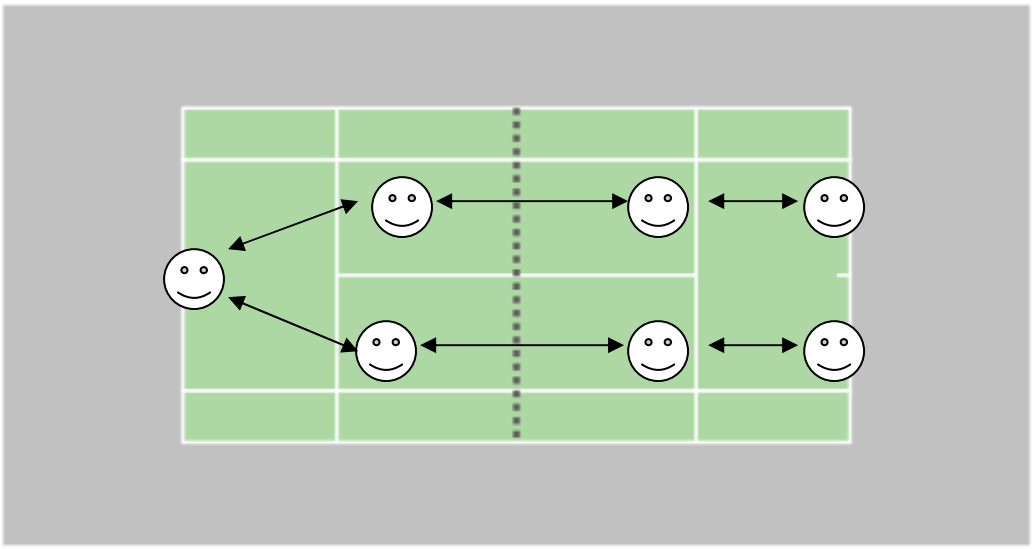
Equipment & Climate Modifications

- All exercises and games will be played with the green dotted ball
- Exercise #1 will be played on a mini-court
- Exercise #2, Game #1, and Game #2 will be played on full length of a court

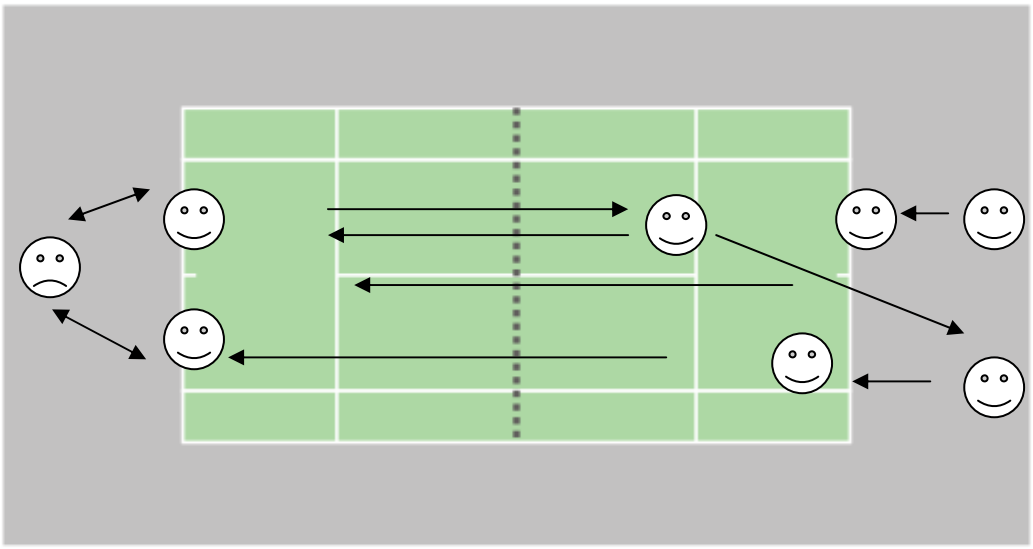
Specific Research Components

- The instructor will have students demonstrate stands and swings of the approach shot and volleys before the start of the exercises (modeling)
- If necessary the exercises will be adjusted to the skill level of the player (task difficulty)
- The instructor will use corrective feedback and prompting (feedback)

Exercise #1:



Exercise #2:



Total session time: approximately 1hour and 17 minutes.
Total rest time: approximately 8 minutes.

Week 5:

Class 9: To play a consistent service and return. (Stage 2)

General outcomes:

- Basic knowledge and experience of service and return of service
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a service
- Knowledge and experience of stands and swing of a return of service
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with a green dotted ball
- Instruction of the day's lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: One student will hit a service the other student will return a service behind the service line. When this is done right their team has 1 point
    - After 10 points the students will switch functions
    - Exercise #2: All students will be split up into 4 groups, one group per court. The groups have to try and hit cones, placed in the service box, with their service
    - Exercise #1 is played one-on-one
    - Exercise #2 is played with groups of 4-5 students
    - Exercise #1 will be done 4 times 4 minutes if the amount of balls is not reached
    - Exercise #2 will be done until there are no more balls in the carts or if all the cones are hit.
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: Students will play on half a court, cross court. The point will start after the server placed the service inside the service box and returner hit the return behind the service line
- Game #2: Students will play on a full court. The point will start after the server placed the service inside the service box and returner hit the return behind the service line. Only an error of your opponent will count as a point.
- Both games will be played for 3 times 5 minutes and the winning player or team will move to the right and the losing player or team will move to the left.

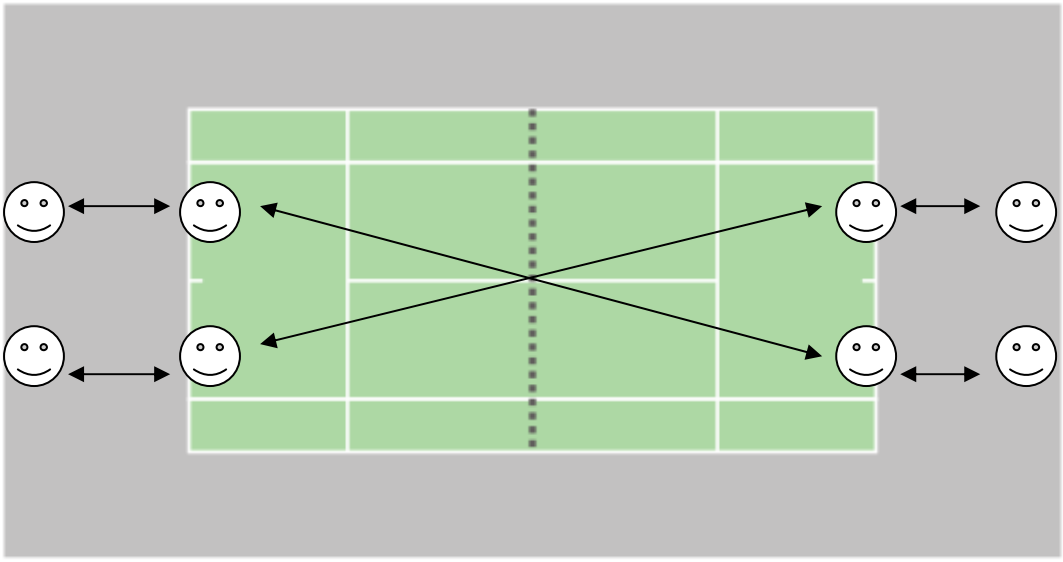
Equipment & Climate Modifications

- All exercises and games will be played with the green dotted ball
- Both exercises will be played on full length of a court
- Both games will be played on full length of a court

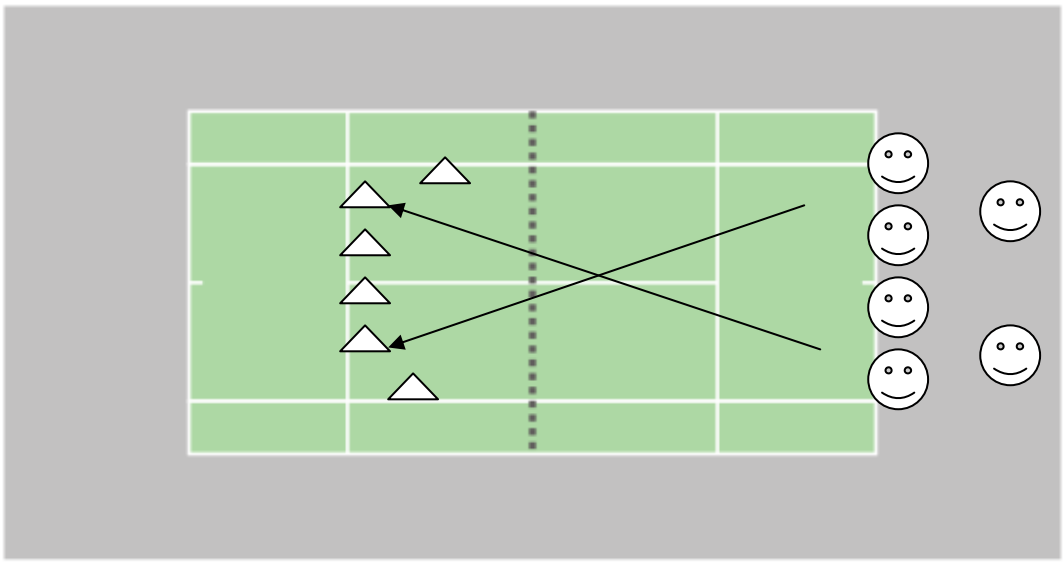
Specific Research Components

- The instructor will have students demonstrate stands and swings of the service and return of service before the start of the exercises (modeling)
- The instructor will use corrective feedback and prompting (feedback)

Exercise #1:



Exercise #2:



Total session time: approximately 1 hour and 17 minutes.
Total rest time: approximately 8 minutes.

Class 10: To play a consistent groundstroke rally (Stage 3)

General Outcomes:

- Basic knowledge and experience of forehand and backhand ground strokes
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a forehand and backhand ground stroke
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with a regular tennis ball
- Instruction of the lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: Playing a rally and trying to hit a cone on three quarter length of half a court
    - Exercise #2: Playing a rally on a full court. The students will try to hit cones placed on the court. Every student will play 2 or 3 rallies and then rotate in and out.
    - Exercise #1 will be played one-on-one
    - Exercise #2 will be played two-on-one
    - Both exercises will be done 3 times 5 minutes if the amount of balls is not reached
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: A groundstroke game played on half a court and the point will start after the first 3 balls of the rally
- Game #2: A student will start with a service and the point will be played out on a full court
- Both games will be played for 3 times 5 minutes and the winning player will move to the right and the losing player will move to the left.

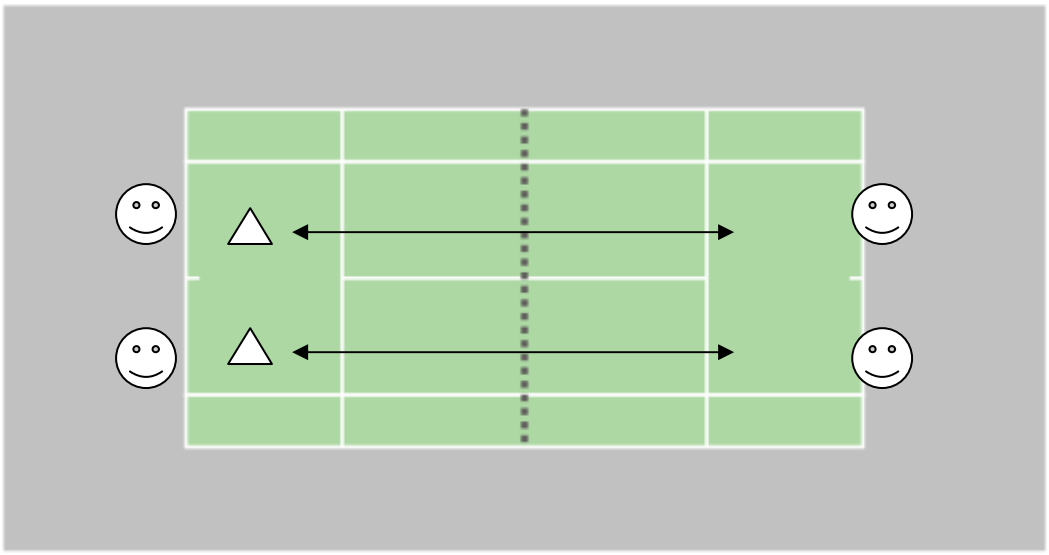
Equipment & Climate Modifications

- All exercises and games will be played with the regular tennis ball
- All exercises and games will be played on full length of a court

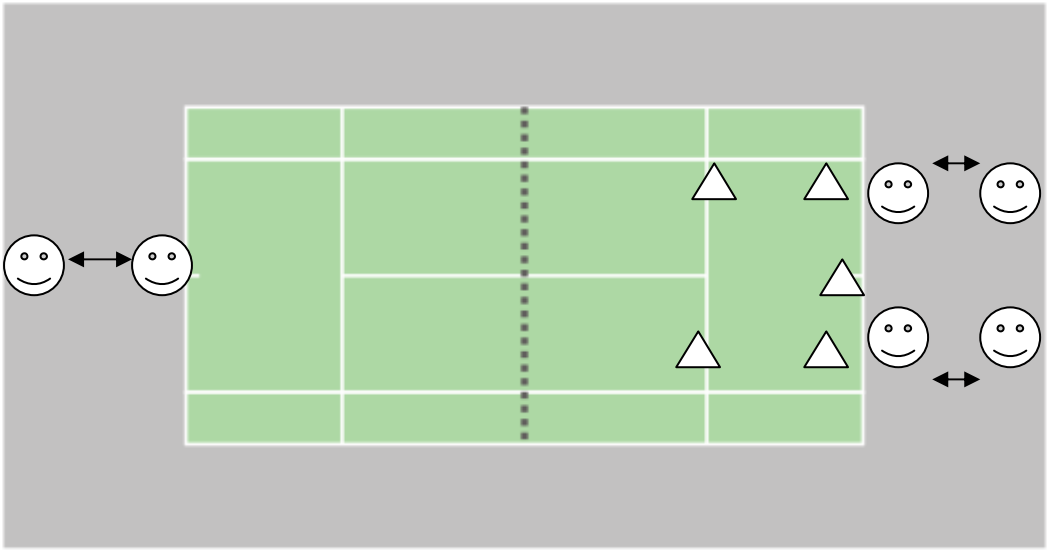
Specific comments

- The instructor will have students demonstrate stands and swings of the ground strokes before the start of the exercises (modeling)
- If necessary the exercises will be adjusted to the skill level of the player (task difficulty)
- The instructor will use corrective feedback and praise (feedback)

Exercise #1



Exercise #2:



Total session time: approximately 1 hour and 19 minutes.
Total rest time: approximately 6 minutes.

Week 6:

Class 11: To play consistent approach and volley.

General outcomes:

- Basic knowledge and experience of forehand and backhand approach shots and volleys
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a forehand and backhand volley
- Knowledge and experience of stands and swing of a forehand and backhand approach shot
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with a regular tennis ball
- Instruction of the day's lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: One student is on the baseline the other at the net. The student at the net will try and hit the ball 10 times behind a line with the regular ball.
    - Exercise #2: One person feeds a shorter ball the other person hits the ball and comes to the net and hits 4 volleys and then rotates to the other side of the court
    - When the amount of balls is reached in an exercise the students will rotate partners
    - Both exercises are played one-on-one
    - Both exercises will be done 4 times 4 minutes if the amount of balls is not reached
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: Both students start on the baseline on half a court. The point starts after the first 3 balls and when the point is won with a volley (direct or indirect) that person will get 2 points.
- Game #2: Up-and –Down doubles, doubles teams will start at the baseline. The team that wins the point can go to the net; the doubles team that loses the point will either go back to the baseline or stay on the baseline. The ball will be fed by another student or teacher. The first volley has to be over the service line.
- Both games will be played for 3 times 5 minutes and the winning player or team will move to the right and the losing player or team will move to the left.

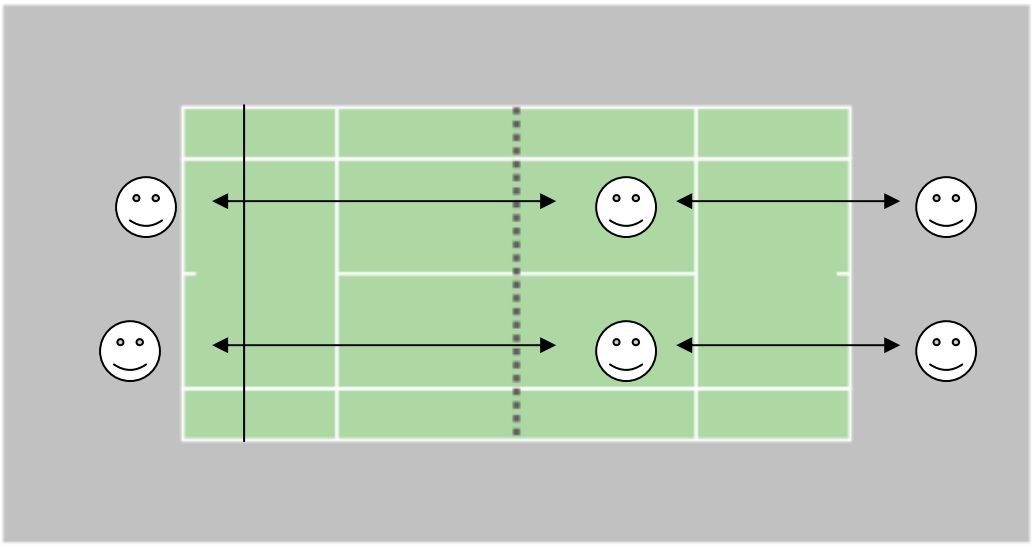
Equipment & Climate Modifications

- All exercises and games will be played with the regular tennis ball
- Exercise #1 will be played on a mini-court
- Exercise #2, Game #1, and Game #2 will be played on full length of a court

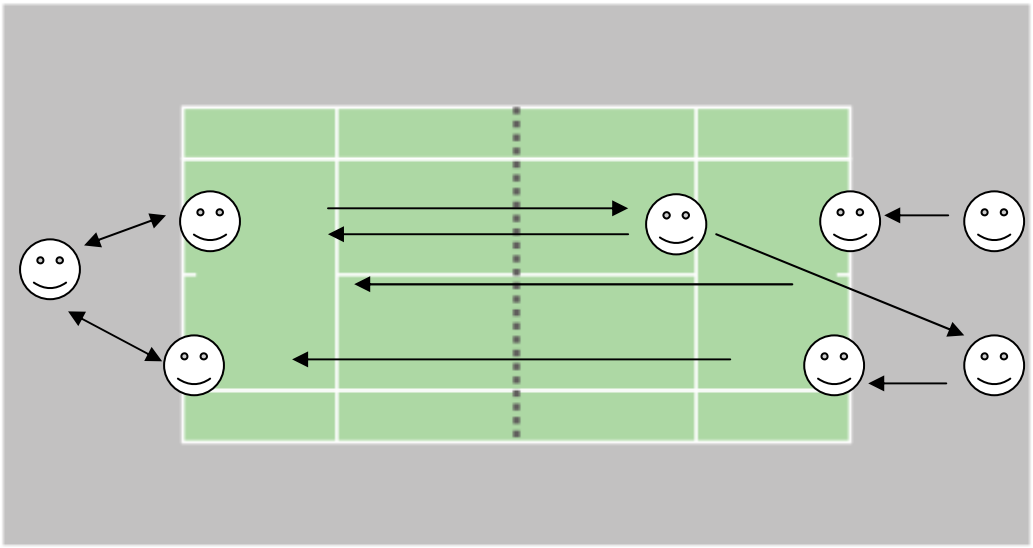
Specific Research Components

- The instructor will have students demonstrate stands and swings of the approach shot and volleys before the start of the exercises (modeling)
- If necessary the exercises will be adjusted to the skill level of the player (task difficulty)
- The instructor will use corrective feedback and praise (feedback)

Exercise #1:



Exercise #2:



Total session time: approximately 1 hour and 17 minutes.
Total rest time: approximately 8 minutes.

Class 12: To play consistent service and return.

General outcomes:

- Basic knowledge and experience of service and return of service
- Basic knowledge and experience of proper technique of strokes

Specific Objectives:

- Knowledge and experience of stands and swing of a service
- Knowledge and experience of stands and swing of a return of service
- Knowledge and experience of racket strike zone and ball placement

Introduction/Warm-up

- 15 minute warm-up with a regular tennis ball
- Instruction of the day's lesson by the instructor

Learning Activities

- The students will do the following activities:
    - Exercise #1: One student will hit a service the other student will return a service behind the service line. When this is done right their team has 1 point
    - After 10 points the students will switch functions
    - Exercise #2: All students will be split up into 4 groups, one group per court. The groups have to try and hit cones, placed in the service box, with their service
    - Exercise #1 is played one-on-one
    - Exercise #2 is played with groups of 4-5 students
    - Exercise #1 will be done 4 times 4 minutes if the amount of balls is not reached
    - Exercise #2 will be done until there are no more balls in the carts or if all the cones are hit.
    - There can be 4-8 students on one court
    - Break-time between and after the two exercises: students can drink some water

Games

- Game #1: Students will play on half a court, cross court. The point will start after the server placed the service inside the service box and returner hit the return behind the service line
- Game #2: Students will play doubles on a full court. Official scoring will be used (15-0, 30-0, 30-15).
- Game #1 will be played for 3 times 5 minutes and the winning player or team will move to the right and the losing player or team will move to the left.
- Game #2 will be played for 15 minutes. Students play the same opponents the entire 15 minutes.

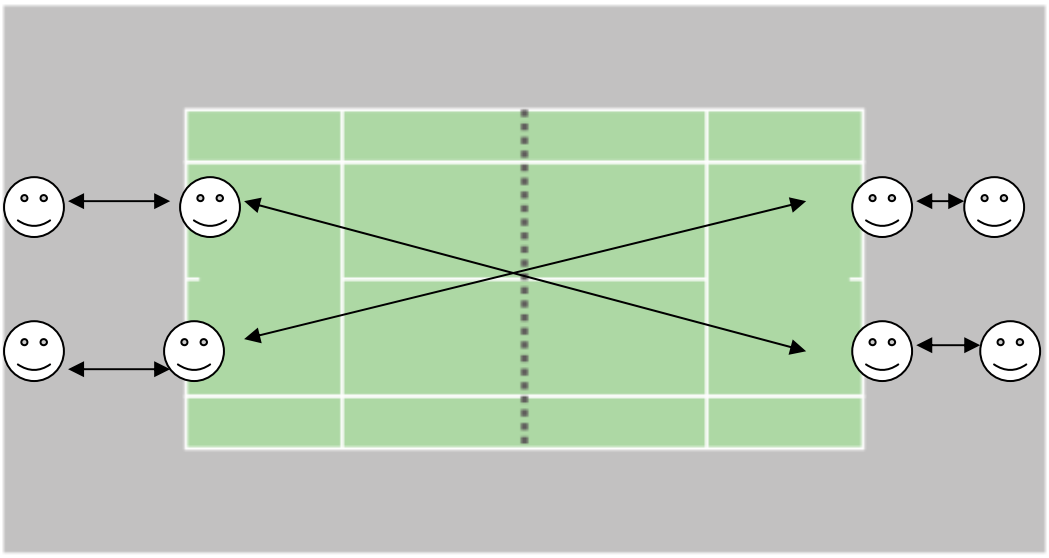
Equipment & Climate Modifications

- All exercises and games will be played with a regular tennis ball
- Both exercises will be played on full length of a court
- Both games will be played on full length of a court

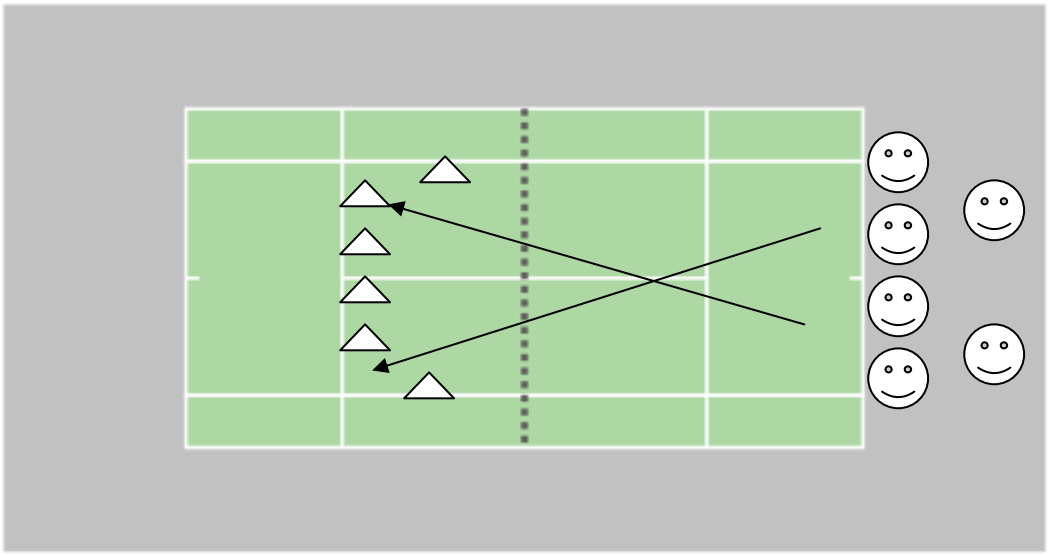
Specific Research Components

- The instructor will have students demonstrate stands and swings of the service and return of service before the start of the exercises
- If necessary the exercises will be adjusted to the skill level of the player (task difficulty)
- The instructor will use corrective feedback and praise (feedback)

Exercise #1:



Exercise #2:



Total session time: approximately 1 hour and 17 minutes.
Total rest time: approximately 8 minutes.

Week 7:

Class 13: Overview of all the strokes. (Stage 3)

General Outcomes:

- Basic knowledge and experience of match play

Specific Objectives:

- Knowledge and experience of tie-break format.

Introduction/Warm-up

- 15 minute warm-up with a regular tennis ball
- Instruction of the day's lesson by the instructor

Games

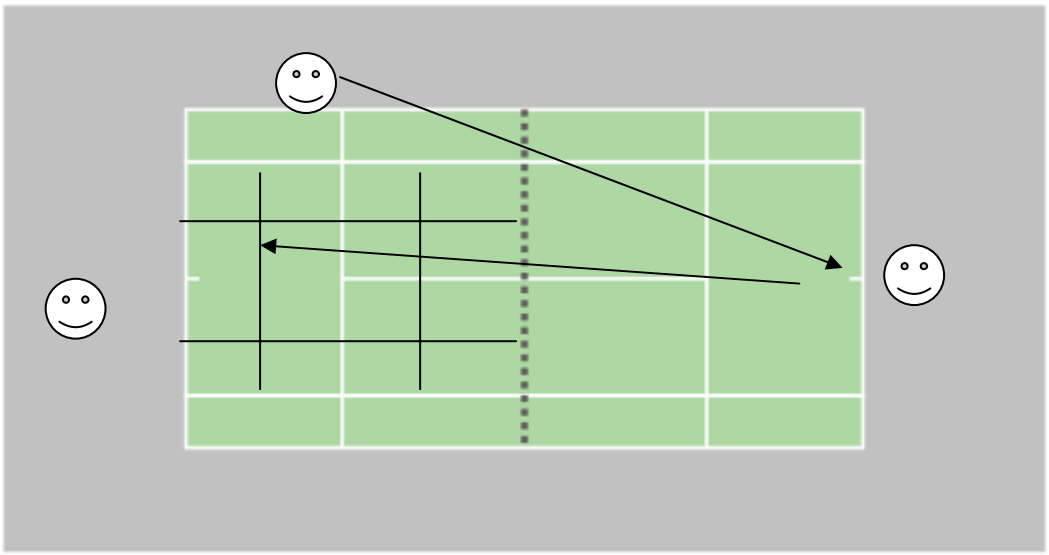
- A super tiebreak tournament. This is a singles tournament up to 10 points, when it is tied 9-9 a deciding point will be played.
- All positions of the tournament will be played out and the students will play at least 3 games.

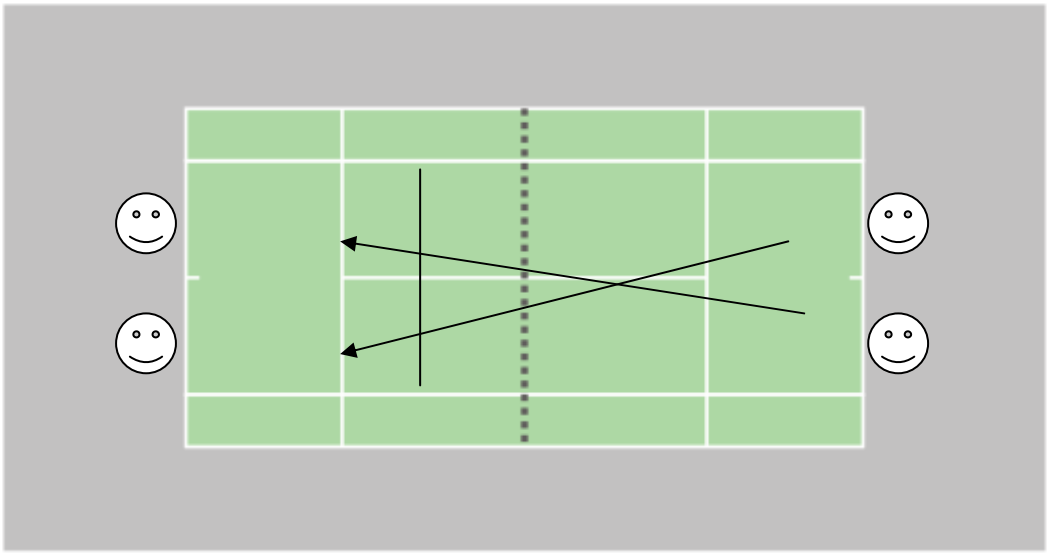
Specific Research Components

- Execution of knowledge and experience of tennis abilities

Total session time: approximately 1 hour and 15 minutes.
Total rest time: approximately 10 minutes.

Class14: A skills test to measure their level of ability followed up by a questionnaire about perceived competence, perceived tennis shot ability and goal orientation.





Appendix C

Pre Test

Name:

Age:

Class:

Your name will be required on this page and this will be removed when the investigator no longer has need for it. Dr. Skye Arthur-Banning and Sander Koning are the only two people who will know about the participant's information. Between pre-test and post-test the questionnaire will be kept locked in a safe. This page with the name will be shredded at the end of the study to make sure that the participant's information will be kept confidential.

The questionnaire will be asking you questions about your perception of competence in tennis and when you feel successful in sport. Although, many of you might not have played tennis prior to this class, your thoughts on how you think you will do are important for this study. The questionnaire consists out of 31 questions and should not take longer than 7-10 minutes to fill in.

Intrinsic Motivation Inventory

For each of the following statements, please indicate how true it is for you, using the following scale:

1	2	3	4	5	6	7
not at all true			somewhat true			very true

1.	I think I will enjoy doing this activity very much	1	2	3	4	5	6	7
2.	I think this activity will be fun to do.	1	2	3	4	5	6	7
3.	I think this will be a boring activity.	1	2	3	4	5	6	7
4.	I think this activity will be quite enjoyable.	1	2	3	4	5	6	7
5.	I think I will be pretty good at this activity.	1	2	3	4	5	6	7
6.	I think I will do pretty well at this activity, compared to other students.	1	2	3	4	5	6	7
7.	While I am doing this activity, I will be thinking about how much I enjoy it.	1	2	3	4	5	6	7

8.	I would describe this activity as very interesting.	1	2	3	4	5	6	7
9.	This activity will not hold my attention at all.	1	2	3	4	5	6	7
10.	After working at this activity for awhile, I will feel pretty competent.	1	2	3	4	5	6	7
11.	This will be an activity that I can't do very well.	1	2	3	4	5	6	7
12.	I will be pretty skilled at this activity.	1	2	3	4	5	6	7
13.	I will be satisfied with my performance at this task.	1	2	3	4	5	6	7
14.	I will put a lot of effort into this.	1	2	3	4	5	6	7
15.	I will not try very hard to do well at this activity.	1	2	3	4	5	6	7
16.	I will try very hard on this activity.	1	2	3	4	5	6	7
17.	It will be important to me to do well at this task.	1	2	3	4	5	6	7
18.	I will not put much energy into this.	1	2	3	4	5	6	7

Consider the statement "*I feel most successful in sport when…*" and read each of the following statements listed below and indicate how much you personally agree with each statement by entering an appropriate score where:

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree

I feel most successful in sport when…

1.	I am the only one who can do the play or skill	1	2	3	4	5
2.	I learn a new skill and it makes me want to practice more	1	2	3	4	5
3.	I can do better than my friends	1	2	3	4	5
4.	The others cannot do as well as me	1	2	3	4	5
5.	I learn something that is fun to do	1	2	3	4	5
6.	Others mess up "and" I do not	1	2	3	4	5
7.	I learn a new skill by trying hard	1	2	3	4	5
8.	I work really hard	1	2	3	4	5
9.	I score the most points/goals/hits, etc.	1	2	3	4	5
10.	Something I learn makes me want to go practice more	1	2	3	4	5
11.	I am the best	1	2	3	4	5
12.	A skill I learn really feels right	1	2	3	4	5
13.	I do my very best	1	2	3	4	5

Appendix D

Post Test

Name:

Age:

Class:

Your name will be required on this page and this will be removed when the investigator no longer has need for it. Dr. Skye Arthur-Banning and Sander Koning are the only two people who will know about the participant's information. Between pre-test and post-test the questionnaire will be kept locked in a safe. This page with the name will be shredded at the end of the study to make sure that the participant's information will be kept confidential.

The questionnaire will be asking you questions about your perception of competence in tennis in the Leisure Skills Tennis class and about how the class is set up. The questionnaire consists out of 48 questions plus demographics and should not take longer than 10-15 minutes to fill in.

Intrinsic Motivation Inventory

For each of the following statements, please indicate how true it is for you, using the following scale:

1 2 3 4 5 6 7
not at all true somewhat true very true

1.	I ejoyed doing this activity very much	1	2	3	4	5	6	7
2.	This activity was fun to do	1	2	3	4	5	6	7
3.	I thought this was a boring activity.	1	2	3	4	5	6	7
4.	I thought this activity was quite enjoyable.	1	2	3	4	5	6	7
5.	I think I am pretty good at this activity.	1	2	3	4	5	6	7
6.	I think I did pretty well at this activity, compared to other students.	1	2	3	4	5	6	7
7.	While I did this activity, I was thinking about how much I enjoyed it.	1	2	3	4	5	6	7
8.	I would describe this activity as very interesting.	1	2	3	4	5	6	7
9.	This activity did not hold my attention at all.	1	2	3	4	5	6	7
10.	After working at this activity for awhile, I will felt pretty competent.	1	2	3	4	5	6	7
11.	This was an activity that I couldn't do very well.	1	2	3	4	5	6	7
12.	I was pretty skilled at this activity.	1	2	3	4	5	6	7
13.	I am satisfied with my performance at this task.	1	2	3	4	5	6	7
14.	I put a lot of effort into this.	1	2	3	4	5	6	7
15.	I did not try very hard to do well at this activity.	1	2	3	4	5	6	7
16.	I tried very hard on this activity.	1	2	3	4	5	6	7
17.	It was important to me to do well at this task.	1	2	3	4	5	6	7
18.	I did not put much energy into this.	1	2	3	4	5	6	7

Think about your leisure skills class and indicate the degree to which you agree or disagree with the following statements.

1 Strongly Disagree	2 Disagree	3 Neither Agree or Disagree	4 Agree	5 Strongly Agree

19.	The LS instructor is most satisfied when every student learns something new.	1	2	3	4	5
20.	The LS instructor looks completely satisfied when students are improving after trying hard.	1	2	3	4	5
21.	The LS instructor insists that students' mistakes are part of learning.	1	2	3	4	5
22.	The LS instructor makes sure that I understand how to perform each new skill before the class moves on to learning other skills.	1	2	3	4	5
23.	The LS instructor is completely satisfied when every student's skills are improving.	1	2	3	4	5
24.	The LS instructor pays special attention to whether skills are improving.	1	2	3	4	5
25.	During the lesson students try to out perform each other.	1	2	3	4	5
26.	Students try to gain rewards outperforming others.	1	2	3	4	5
27.	Students feel most satisfied when they manage to outperform others.	1	2	3	4	5
28.	The most important thing is for a student to demonstrate that he or she is better in the LS activity than others.	1	2	3	4	5
29.	Successful students are thought to be those who perform skills better than their classmates.	1	2	3	4	5
30.	Students worry about failure in performing skills because it would lead to the disapproval of others.	1	2	3	4	5
31.	Students worry about failure in performing skills because they would not look good in the eyes of the LS teacher.	1	2	3	4	5
32.	Students worry about performing skills that they are not particularly good at.	1	2	3	4	5
33.	Students feel very badly when they make mistakes while performing skills or playing games.	1	2	3	4	5
34.	Students feel very badly when they can't perform a skill as well as others.	1	2	3	4	5

35.	It is very significant to win without trying hard.	1	2	3	4	5
36.	The LS instructor looks completely satisfied with those students who manage to win with little effort.	1	2	3	4	5
37.	Students feel most satisfied when they win with little effort.	1	2	3	4	5
38.	Successful students are thought to be those who score the most points with little effort.	1	2	3	4	5
39.	The way the lesson is taught helps me learn how to do the LS by myself.	1	2	3	4	5
40.	The way the lesson is taught helps me learn how to use LS skills to improve my health.	1	2	3	4	5
41.	I feel very satisfied when I learn something new.	1	2	3	4	5
42.	I feel very satisfied when I learn new skills and games.	1	2	3	4	5
43.	I enjoy trying my best to learn a skill.	1	2	3	4	5
44.	I learn something enjoyable in the LS class.					
45.	What I learn makes me want to practice the skill more.					

General Questions:

Did the use of the balls overall help you develop/improve your skills?
○Yes
○No

What was most helpful developing/improving your overall skills?
○Equipment (balls, cones)
○Instruction/Feedback of the teacher
○Smaller courts during exercises
○Modeling of the strokes by a student
○Modeling of the strokes by the instructor
○Something else….

Would you recommend the way the class was taught for developing/improving your skills in a Leisure skills class?
○Yes
○No

Demographics

☐ Male

☐ Female

Age:……

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